Public Consultation

ASX Market Management Consultation 2: Potential Enhancements

31 October 2022

Invitation to comment

ASX is seeking submissions on aspects of ASX's approach to market management in the event of an incident on the ASX market.

Submissions are due by Friday 9 December 2022 and should be sent by email to:
consultations@asx.com.au

or by mail to:
ASX Limited
PO Box H224
Australia Square NSW 1215
Attention: ASX Consultations

ASX would prefer to receive written submissions in electronic form.
If you would like to meet and discuss the consultation paper please call:
- Rob Nash on +61 2 9227 0032 or
- Ben Jackson on +61 2 9227 0897

If you would like your submission, or any part of it, to be treated as confidential, please indicate this clearly in your submission. ASX reserves the right to publish the non-confidential submissions it receives and consider publishing those submissions in whole or on a summary basis. Where a submission, or part thereof, is marked confidential ASX will consider publishing the content on a summarised and anonymous basis. Where ASX is required by a regulator or otherwise required by law to produce a submission it has received, ASX will use its best endeavours to advise the submitter ahead of the production of the submission.

Contacts
For general enquiries, please contact:
Rob Nash
T +61 2 9227 0032
E rob.nash@asx.com.au

Ben Jackson
T +61 2 9227 0897
E ben.jackson@asx.com.au

For media enquires:
Matthew Gibbs
T +61 2 9227 0218
E matthew.gibbs@asx.com.au

Contents

1. Introduction

1.1 Background

This consultation is the second in a sequence of three consultations ASX Limited (**ASX**) will be undertaking as ASX implements its response to ASIC's expectations of Market Operators set out in ASIC's Report 708[1] (REP 708).

Further context for this sequence of consultations was set out in section 1 of ASX's first market management consultation published on 28 June 2022[2] (**Consultation 1**).

1.2 ASX's consultation approach

The timeline for ASX's intended three consultations to meet a number of ASIC's expectations is:

- **28 June 2022: Consultation 1** which broadly assessed the current position and considers refinements and improvements based on current capabilities. The period for comment on this consultation closed on 23 July 2022 and ASX response was published on 19 October 2022.
- **31 October 2022: second market management consultation** (this consultation, **Consultation 2**) which incorporates feedback from Consultation 1 and considers improvements based on potential future capabilities.
- **February 2023: testing consultation,** which will cover potential improvements to participant testing and incorporate agreed changes arising from Consultation 1 and Consultation 2.

1.3 This second market management consultation

The commentary in this consultation paper has been divided into sections addressing different topics:

- Section 2: A proposal for a new order download service
- Section 3: A proposal for a new trade download service
- Section 4: A proposal to provide an order cancellation capability in certain incident scenarios
- Section 5: A proposal for an intraday restart capability
- Section 6: Policies for disabling certain market components

The first part of each section is a brief introduction to the topic.

This is followed by a statement of the business objective(s) of the proposal(s). Subsequent sub-sections discuss different issues relevant to the topic and typically contain more detailed technical information.

ASX is not providing final detailed specifications of potential future services in this proposal, nor a timetable for implementation. Rather, ASX is seeking to provide sufficient business and technical detail to allow stakeholders to assess the technical and operational impact, business value and overall viability of each of the proposals.

Those proposals which receive stakeholder feedback suggesting they will have an acceptable and positive impact, deliver meaningful value and are broadly deemed viable, will be candidates for implementation.

[1] https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-708-asic-s-expectations-for-industry-in-responding-to-a-market-outage/
[2] https://www2.asx.com.au/content/dam/asx/about/regulations/public-consultations/2022/market-management-consultation-28062022.pdf

The questions being asked are set out in orange boxes throughout this consultation paper. For your convenience, ASX has also collated them together in Annexure A of this consultation paper.

1.4 Stakeholders invited to comment

ASX welcomes feedback to this consultation paper from all interested stakeholders. ASX is particularly keen to receive feedback from:

- ASX Participants;
- ASX subscribers;
- retail and wholesale investors;
- industry bodies representing the groups above; and
- other Market Operators.

This consultation covers proposals which necessarily require some detailed discussion of a technical nature. ASX expects such technical detail will be most relevant to ASX Participants and ASX subscribers; the business objectives of each proposal may be more relevant to the wider group of stakeholders.

Stakeholders should feel free to limit their responses to those parts of the consultation paper and the consultation questions that are of particular interest to them. Where appropriate, ASX identifies questions where the opinions of a specific group of stakeholders is sought.

1.5 Due date for responses to this consultation paper

Stakeholders interested in making a submission to this consultation are asked to do so in writing by the **close of business on 09 December** 2022 by:

- email to:
  consultations@asx.com.au
- mail to:
  ASX Limited
  PO Box H224
  Australia Square NSW 1215
  Attention: ASX Consultations

ASX would prefer to receive written submissions in electronic form. If you would like to meet and discuss the consultation paper please call Rob Nash on +61 2 9227 0032 or Ben Jackson on +61 2 9227 0897.

If you would like your submission, or any part of it, to be treated as confidential, please indicate this clearly in your submission. ASX reserves the right to publish the non-confidential submissions it receives and consider publishing those submissions in whole or on a summary basis. Where a submission, or part thereof, is marked confidential ASX will consider publishing the content on a summarised and anonymous basis.

Where ASX is required by a regulator or otherwise required by law to produce a submission it has received, ASX will use its best endeavours to advise the submitter ahead of the production of the submission.

1.6 Summary of consultation

A summary of the four proposals considered in Consultation 2:

ORDER DOWNLOAD SERVICE (ASIC'S EXPECTATION 3)	
Proposal - An automated service to provide ASX Participants with a definitive list of orders in ASX Trade during a market outage or disruption. - Accessed and used systematically by ASX Participants. - Service will only be available in incident scenarios and not during normal operations. **See section 2**	**Potential Benefits** - Provide sufficient information to assist stakeholders in incident scenarios - in particular, provide all the information required to support reconciliation and cancellation of orders. - Definitive as to the orders in ASX Trade. - Source data directly from the matching engine - so more robust. **Potential Limitations** - May be impacted by incidents affecting the matching engine itself. - Development may be required by ASX Participants.

TRADE DOWNLOAD SERVICE (ASIC'S EXPECTATION 3)	
Proposal - An automated service to provide ASX Participants with a definitive list of trades executed in ASX Trade during a market outage or disruption. - Accessed and used systematically by ASX Participants. - Service will only be available in incident scenarios and not during normal operations. **See section 3**	**Potential Benefits** - Provides sufficient information to assist stakeholders in incident scenarios – in particular, providing the information required to determine executed transactions. - Definitive as to the trades that have executed in ASX Trade. - Unlikely to be impacted by incidents affecting other components downstream of the matching engine. **Potential Limitations** - May be impacted in certain scenarios. - Development may be required by ASX Participants.

CANCEL ONLY SESSION STATE
(ASIC'S EXPECTATION 2)

Proposal

- A new session state, that in some incident scenarios, would allow ASX Participants to cancel orders.
- CANCEL_ONLY will only be utilised when a decision has been made that the Market will not be re-opening[3].
- Provides an alternative to remaining in ENQUIRE for the remainder of the day when it is not possible to move to ADJUST.
- Participants would receive a systematic response to order cancellations
- The potential to be used in conjunction with ASX's proposed new order download service.

See section 4

Potential Benefits

- Specifically for the purpose of allowing ASX Participants to cancel orders during incidents
- Allows the cancellation of working orders without relying on normal broadcast responses which may have been corrupted.
- Avoids the potential risk of inaccurate, incomplete or duplicate market data or private data being broadcast.
- Any processes that could broadcast erroneous market data would be shut down in this session state.
- Accessible via existing protocols.

Potential Limitations

- Once the market is moved to 'CANCEL ONLY' it can't be re-opened that trading day.
- May be impacted by incidents affecting the matching engine itself.
- Development may be required by ASX Participants.

INTRADAY RESTART
(ASIC'S EXPECTATION 5)

Proposal

- Introduction of an intraday restart capability of ASX Trade.
- A concept which would be utilised in the most severe ASX Trade incidents.

See section 5

Potential Benefits

- Facilitates market resumption by remediating functional issues and re-establishing accurate market and private data.
- Ability to preserve long orders, where possible.
- On resumption of trading, ASX Trade will increment trade and trade slip numbers.

Potential Limitations

- ASX recognises this is a complex change for both ASX and ASX Participants.
- Day orders and OUCH orders will not be preserved. Development may be required by ASX Participants.

[3]. CANCEL_ONLY can be used in situations where it is determined as safe to do so and only when it has been determined that moving to ADJUST is not a viable option. The market will likely be unrecoverable the same day once CANCEL_ONLY is used (without a restart).

2. Order Download Service

2.1 Background

As described in Consultation 1[4], ASX currently provides a service through which ASX Participants are able to obtain information about their current orders during an incident. As noted in Consultation 1, these services are operated manually on request and may be impacted in certain incident scenarios[5].

This section proposes an automated service that is less likely to be impacted in certain incident scenarios and will provide a definitive list of orders in ASX Trade.

2.2 Business objectives

The objective of these proposals is to provide a new order confirmation service that:

- is **less prone to be impacted in incident scenarios** – by removing dependencies on internal ASX Trade processes;
- is **automatically generated** and requires no manual processing by ASX – other than to initiate the service (where relevant) during incidents;
- can be **accessed and used systematically** by ASX Participants – some development will be required;
- **provides sufficient information** to assist stakeholders in incident scenarios – in particular, provide all the information required to support reconciliation and cancellation of orders; and
- when available, is **definitive** as to the orders in ASX Trade.

2.3 Improved reliability

ASX's existing order confirmation service sources data from an ASX Trade OMNet component that is downstream of the matching engine[6]. The existing service may therefore be impacted in the event that an incident impacts OMNet.

ASX's proposed new order download service ("**ODS**") will source data directly from the matching engine. The ODS will not be impacted by incidents affecting components downstream of the matching engine but may be impacted by incidents affecting the matching engine itself.

The respective positions of the data sources in the ASX Trade architecture is illustrated in the diagram below, which provides a simplified overview of the market data and private data flows.

ASX assesses that the proposed ODS would not have been impacted by either the September 2016 incident or the November 2020 incident and, were it in place at that time, the ODS would have been available during both incidents.

The matching engine is the ultimate source of order data in ASX Trade. If the matching engine is impacted in an incident[7], ASX may not be able to provide any information about outstanding orders and may need to deem all orders as having been lost. In such circumstances, there will be no systematic messaging about the lost orders – ASX will inform stakeholders via the ASX System Status Page ("SSP").

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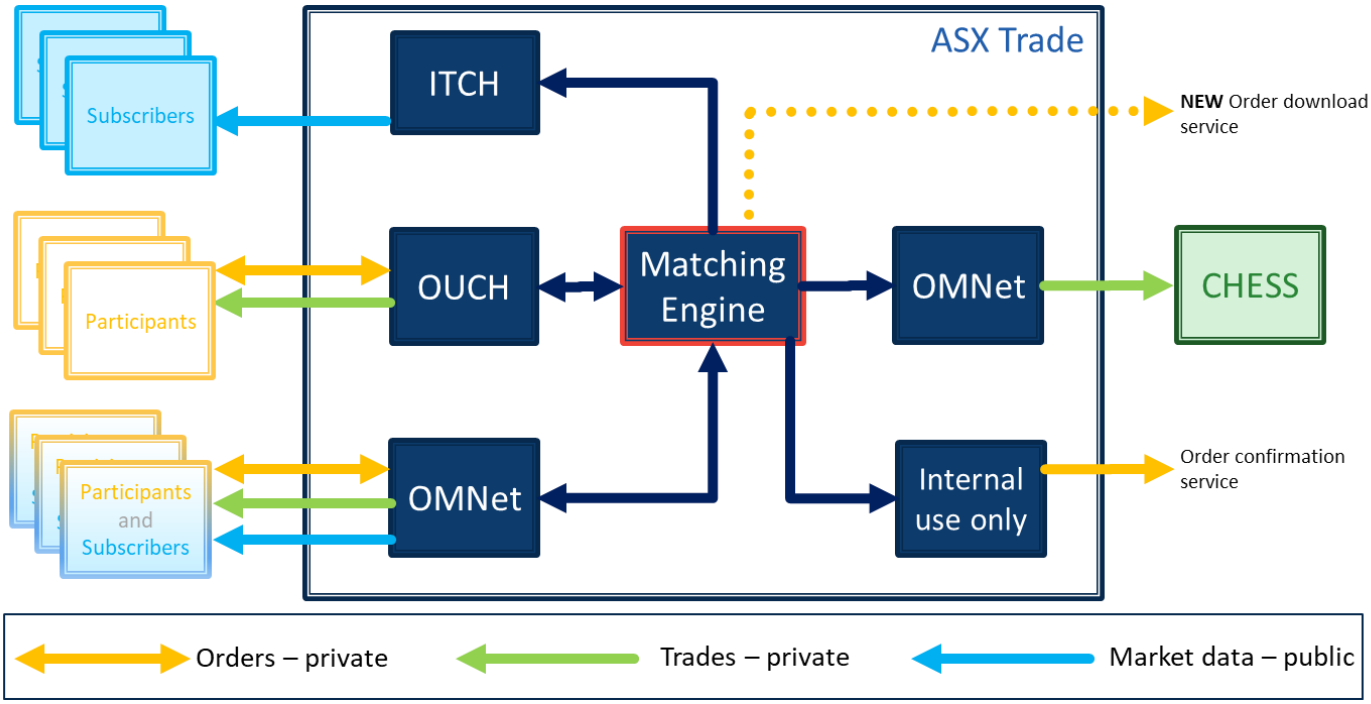
[4] https://www2.asx.com.au/content/dam/asx/about/regulations/public-consultations/2022/response-to-consultation-paper-1-on-asx-market-management-feedback-summary.pdf

[5] The current services were partially impacted by the September 2016 incident and the November 2020 incident.

[6] Sometimes also referred to as 'partitions'. Generally, a partition refers to a distinct logical 'stripe' throughout the system. ASX Trade is not fully partitioned – some processes cater for instruments managed by all four matching engines. The term 'partition' is therefore not used.

[7] The matching engine was not impacted in September 2016 or November 2020.

Given that the ODS sources data from the matching engine, and will therefore impact the performance of the matching engine, the ODS will only be available in incident scenarios and not during normal operations. The existing order confirmation service[8] will continue to be available at other times.



2.4 Automatically generated

The current order confirmation service is a manual process performed on demand by ASX's Trading Operations team on a best endeavours basis.

The Participant order data files produced by ODS will be generated automatically following an incident.

When an incident occurs, and after ASX Trade has been placed into ENQUIRE, ASX will initiate the process to extract, from each matching engine, the source data for the ODS. ASX will then make the ODS data available to ASX Participants.

2.5 Systematically available and usable

One file of orders will be created for each combination of ASX Trade Participant ID ("**PID**") and ASX Trade matching engine[9]. Files will be provided in a machine readable format such as csv.

The number of files will not be impacted by the nature of the incident. However, the contents of the files may be impacted by the nature of the incident. ASX Participants should be capable of handling ODS files with zero records where a matching engine has been impacted.

ODS File Contents

An ODS file will contain records where the matching engine is available and the PID has orders in that matching engine.

An ODS file will contain no records where:

[8] https://www2.asx.com.au/markets/market-resources/incident-management
[9] ASX Participants should therefore currently expect 4 files.

- the matching engine is available but the PID has no orders in that matching engine
- the matching engine is impacted and, as a result, there are no orders in that matching engine

Secure File Transfer Protocol (SFTP)

The ODS files will be placed in a directory in ASX's SFTP site accessible only by the relevant Participant's authorised SFTP client.

ASX will inform ASX Participants that the ODS files are available via an update to ASX's SSP. The update will be issued as soon as the ODS files are available. All subsequent updates to the SSP will also confirm that ODS files are available.

2.6 Sufficient information

The content of the ODS file will be sufficient to allow an ASX Participant to generate a cancellation message for each order in the file:

- in accordance with any protocol that may be used to cancel such an order; and
- without the need for separately sourced instrument reference data or order data.

This is illustrated in the table below:

Data Element	Available in ODS	Cancellation Message			
		MO4 – single[10]	MO4 – bulk	OUCH X	OUCH Y
Order identifiers					
Order ID	YES	YES	n/a	n/a	YES
Order token	YES[11]	n/a	n/a	YES	n/a
Instrument identifiers					
Series	YES	YES	YES[12]	n/a	n/a
Order book ID	YES	n/a	n/a	n/a	YES
Symbol	YES[13]	n/a	n/a	n/a	n/a
Other order details[14]					
Side	YES	YES	Optional	n/a	YES
Customer	YES	n/a	Optional	n/a	n/a
User	YES	n/a	Optional	n/a	n/a
Client	YES	n/a	Optional	n/a	n/a
Price	YES	n/a	n/a	n/a	n/a
Size	YES	n/a	n/a	n/a	n/a

[10] MO4 is the OMNet transaction used to cancel/delete orders.
[11] Only relevant to and provided for orders submitted via OUCH.
[12] Can be provided as a complete series or an underlying.
[13] Whilst not required by any deletion message, symbol has been included to improve human readability.
[14] This is not an exhaustive list and reflects the minimum level of data that would be provided.

2.7 Definitive

Where the ODS is available, both non-zero and zero record files, can be taken as a definitive statement of the orders present in ASX Trade.

In the most extreme incident scenarios impacting one or more matching engines, the ODS will not be available for the impacted matching engine(s). In such circumstances, ASX will declare all orders lost and unable to recovered.

Incident scenario	Current service available	ODS available	Orders preserved
Downstream component impact	Unlikely	YES	YES
Limited matching engine impact	Unlikely	YES	YES
Severe matching engine impact	NO	NO	NO

ASX proposes to develop a new, more secure and robust order download service (ODS) for use during incidents, to improve certainty over Participant order book positions.

Question 2.1: Are you supportive of this proposal?

Question 2.2: If so, how could you make use of the service?

Question 2.3: Please provide any further feedback you have regarding this proposal?

Question 2.4: In considering data security - would there be any challenges if private data fields (exClient Info, Customer Info and Regulatory data) was omitted from the file?

3. Trade Download Service

3.1 Background

As described in Consultation 1, ASX currently provides a service through which ASX Participants are able to obtain information about their executed trades during an incident. As noted in the consultation, these services are produced manually on request and may be impacted in certain incident scenarios[15].

The data provided from this service must always be considered in the context of any separate advice ASX gives about the status of trades further to any Fair, Orderly and Transparent (FOT) review undertaken by ASX. Consequently, whilst the current service provides a list of trades present in ASX Trade it does not, in isolation, serve as a definitive statement of trades that are valid.

This section provides details of a proposed new automated service, that is less likely to be impacted in certain incident scenarios, that will provide a definitive list of trades in ASX Trade.

3.2 Business objectives

The objective of these proposals is to provide a new trade confirmation service that:

- is **less prone to be impacted in incident scenarios** – by reducing dependencies on internal ASX Trade processes;
- is **automatically generated** and requires no manual processing by ASX – other than to initiate the service (where relevant) during incidents;
- can be **accessed and used systematically** by ASX Participants – some development will be required;
- **provides sufficient information** to assist stakeholders in incident scenarios; and
- will be made available in the event of an outage, is **definitive** as to the trades present in ASX Trade[16].

3.3 Improved reliability

ASX's existing trade confirmation service sources data from an ASX Trade OMNet component that is downstream of the matching engine. The existing service may therefore be impacted in the event that an incident impacts OMNet.

ASX's new trade download service ("**TDS**") will source data directly from the ASX Trade component that adds the trade identifier required by CHESS (the "Trade Handler"). Trade Handler is downstream of the matching engine and is unlikely to be impacted by incidents affecting other components downstream of the matching engine but may be impacted by incidents affecting the matching engine itself.

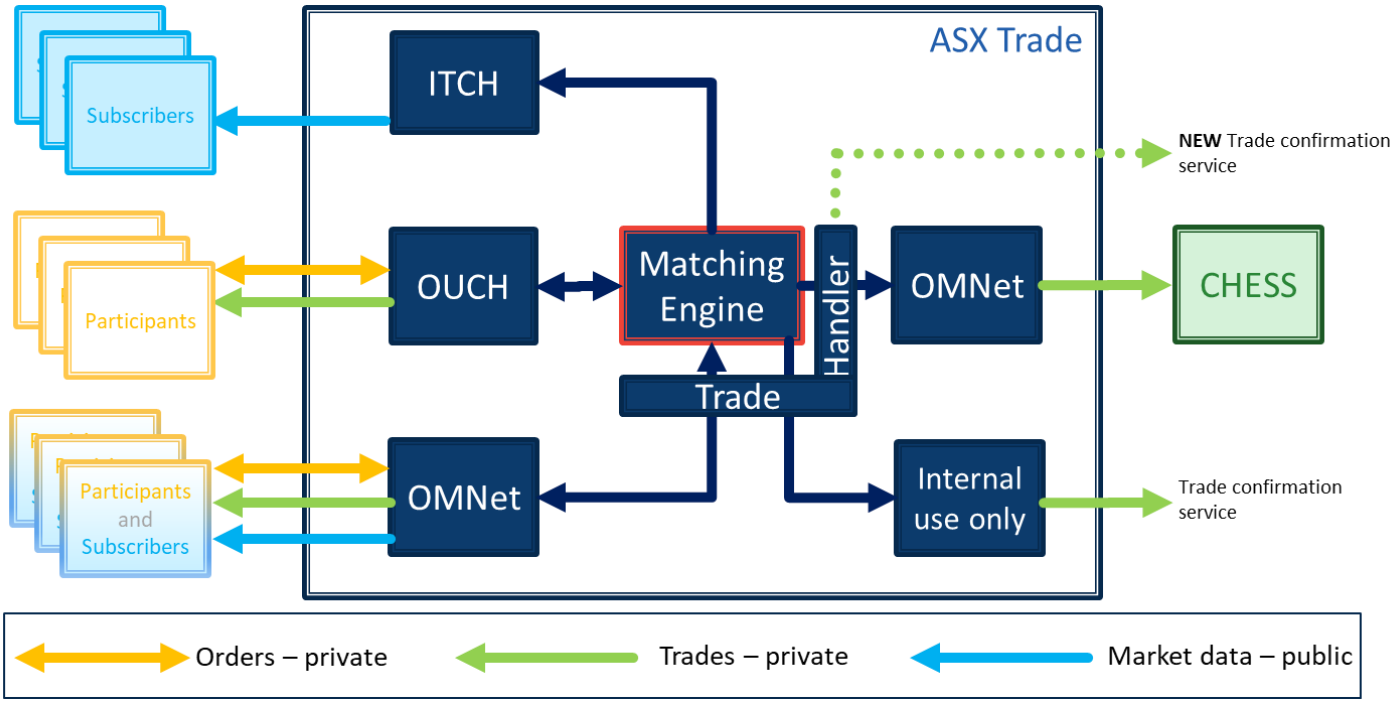
The respective positions of the data source in the ASX Trade architecture is illustrated in the diagram below, which provides a simplified overview of the market data and private data flows.

ASX assesses that the TDS would not have been impacted by either the September 2016 incident or the November 2020 incident and the TDS would have been available during both incidents.

[15] The current services were partially impacted by the September 2016 incident and the November 2020 incident.
[16] The intention would be that any FOT review would be concluded and communicated prior to TDS being made available. However, there may be certain situations when it is more timely to enable TDS and then subsequently communicate FOT assessment decision.

Given the TDS sources data from the Trade Handler, and therefore impacts the performance of the Trade Handler engine, the TDS will only be available in incident scenarios and not during normal operations. The existing trade confirmation service will continue to be available at other times.

In the event that Trade Handler is unavailable, TDS will source data from an internal ASX component not dependent on OMNet.



3.4 Automatically generated

The current trade confirmation service is a manual process performed on demand by ASX's Trading Operations.

The Participant trade data files produced by the TDS will be generated automatically following an incident.

When an incident occurs and after ASX Trade has been placed into ENQUIRE, ASX will initiate the process to extract, from the Trade Handler, the source data for the TDS.

Once any FOT review[17] has been completed, ASX will ensure that the TDS files reflect the FOT review of trades. ASX will then make the TDS data available for ASX Participants.

3.5 Systematically available and usable

One file of trades will be created for each combination of ASX Trade Participant ID ("**PID**") and ASX Trade matching engine[18]. Files will be provided in a machine readable format such as csv. The number of files will not be impacted by the nature of the incident. However, the contents of the files may be impacted by the nature of the incident. ASX Participants should be capable of handling TDS files with zero records where there are no trades for that matching engine.

[17] referenced in Market management Consultation paper 1.
[18] ASX Participants should therefore currently expect 4 files.

TDS File Contents

A TDS file will contain records where the PID has one or more trades from that matching engine. A TDS file will contain no records where the PID has no trades from that matching engine.

Secure File Transfer Protocol (SFTP)

The TDS files will be placed in a directory on ASX's secure FTP site accessible only by authorised users of the relevant ASX Participant.

ASX will inform ASX Participants that the TDS files are available via an update to ASX's SSP. The update will be issued as soon as the TDS files are available.

3.6 Sufficient information

The content of the TDS file will replicate the data provided in the CB15 Directed Trade Broadcast[19] and the following additional content:

- Orderbook ID - the instrument ID used by ITCH and OUCH
- Symbol

The TDS file will contain:

- executions on the current business day;
- trade reports on the current business day;
- cancellations on the current business day; and
- reports of FSSBSC[20] trades including:
  - initial trade reports received on the previous business day where the corresponding delayed trade report was unpublished at the start of the current business day;
  - initial trade reports received on the current business day; and
  - delayed trade reports published on the current business day.[21]

3.7 Definitive

TDS files will always be made available in the event of an outage. The content of the TDS files can be taken as a definitive statement of trade validity.

Given the TDS file is intended to serve as a definitive statement of valid trades, it will not be made available until any FOT review has been completed and actioned. Any trades deemed as invalid during the FOT review will be flagged as invalid in the file.

ASX proposes to develop a new, more secure and robust trade download service (TDS) for use during incidents, to improve certainty over executed trades.

Question 3.1: Are you supportive of this proposal?

Question 3.2: If so, how could you make use of the service?

Question 3.3: Please provide any further feedback you have regarding this proposal?

Question 3.4: In considering data security - would there be any challenges if private data fields (Customer Info, Account ID and Regulatory Data) was omitted from the file?

[19] Section 26, ASXT Broadcasts - https://www.asxonline.com/content/dam/asxonline/public/documents/asx-trade-refresh-manuals/asx-trade-broadcasts.pdf
[20] FSSBSC - Facilitated Specified Size Block Special Crossing, also referred to as "*Large Principal Transactions*" under the MIRs.
[21] The corresponding initial trade report, which may have been received on the previous business day or current day, will also be present in the TDS file.

4. CANCEL_ONLY session state

4.1 Background

As discussed in Consultation 1, ASX's overriding obligation is, to the extent that it is reasonably practicable, to do all things necessary to ensure that each of its licensed markets is FOT. A consequence of this obligation is that ASX's incident management process will necessarily result in ASX Trade remaining in ENQUIRE if moving out of ENQUIRE will result in the potential broadcast of inaccurate, incomplete or duplicate market data or private data. ENQUIRE also appropriately prevents ASX Participants amending or cancelling orders as this very action may trigger a broadcast of inaccurate, incomplete or duplicate market data.

Respondents in Consultation 1 agreed that freezing the ASX market is the appropriate course of action if there is a chance of corrupt market data. Some feedback provided included a temporary freeze – then, if the market can't be moved to ADJUST, potentially something less restrictive that would permit the cancellation of orders.

ASX appreciates that ASX Participants wish to (at least) cancel orders in ASX Trade in order to 'cancel back' such orders to their internal systems. This would facilitate transmission of such orders by ASX Participants to alternative execution venues[22].

This section discusses a potential new session state, CANCEL_ONLY ("**CANCEL_ONLY**"), as an alternative to ADJUST, that in some incident scenarios, would allow ASX Participants to cancel orders (via OMNet and OUCH), and receive a systematic response that would avoid the broadcast of inaccurate, incomplete or duplicate market data or private data. During this session state, processes broadcasting erroneous market data would be shut down.

CANCEL_ONLY can only be used in situations where it is determined as safe to do so and only when it has been determined that moving to ADJUST is not a viable option. The market is not likely to be recoverable the same day once CANCEL_ONLY is used.

The CANCEL_ONLY state will be used in scenarios where the market data broadcasts have been determined to be corrupted and therefore a resumption of the market is no longer possible.

The CANCEL_ONLY session state could be used in conjunction with the introduction of ASX's proposed new Order Download Service, i.e. Participants will need an accurate record of their order IDs to be able to cancel these orders.

No functional change[23] to ASX Trade is required to deliver the proposed new session state. However, ASX Participants – in particular, OMNet users – that wish to make use of the new session state may need to undertake development.

ASX proposes that when it remains inappropriate to move to ADJUST due to the potential broadcast of erroneous market data, ASX would instead disable the process that publishes market data and move to CANCEL_ONLY[24] instead if it is considered safe to do so.

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[22] As noted in the first management consultation, ASX's existing incident management process affords stakeholders time to cancel any orders in ASX trade before they can be executed. However, cancellation would not occur in real-time but during the market recovery. Given this timing offset, and the consequent lack of systematic messaging until any cancellation occurs, this approach may present technical, risk and compliance challenges to stakeholders in managing their orders in their own systems.

[23] Only configuration changes are required.

[24] Moving to CANCEL_ONLY allows erroneous market data broadcasting processes to be shut down to ensure that no incorrect, incomplete or duplicate data is disseminated. In addition, CANCEL_ONLY does not allow order amendments, which may have posed risks to ASX systems.

If CANCEL_ONLY had been available in the November 2020 incident and further to ASX's market closure assessment process[25] which is now in place, ASX estimates that the ASX markets could have moved to CANCEL_ONLY at around midday[26].

ASX also assesses that CANCEL_ONLY could have been used during the September 2016 incident.

4.2 Business objectives

The objective of this proposal is to provide a new capability to support the cancellation of orders during incidents that:

- **provides an alternative to remaining in ENQUIRE** when it is not possible to move to ADJUST and:
  - is **likely to be available in incident scenarios** – by substantially removing dependencies on internal ASX Trade processes other than the matching engine, gateways and a small number of critical subsystems;
  - will be offered via new session state "**CANCEL_ONLY"** specifically for the purpose of allowing ASX Participants to cancel orders during incidents; and
  - **allows for processes that may broadcast inaccurate, incomplete or duplicate market data to be shut down;**
- is **accessible via existing protocols** – OMNet and OUCH;
- **provides a systematic response** – using existing message flows - noting that, in the case of OMNet, an existing transaction acknowledgement ('Ack') is used instead of the BO5 Broadcast; and
- is **not dependent on the data**[27] typically acquired by ASX Participants' application initiation processes[28] – and can therefore be used when ASX Trade reference data queries and messaging are impacted[29].

4.3 Functional behaviour

The table below illustrates the functional behaviour during the proposed new CANCEL_ONLY session state in comparison with the existing ENQUIRE and ADJUST session states to illustrate how it provides the key desired functional behaviour from ADJUST whilst avoiding the risks that ADJUST creates with respect to the maintenance of a FOT market.

Activity	ENQUIRE	CANCEL_ONLY	ADJUST
Participant interactions			
Order entry	NO	NO	NO
Order amendment	NO	NO	YES
Order cancellation	NO	YES	YES

[25] Discussed in section 3.8 of the first market management consultation.
[26] This assumes that the market closure assessment would have determined the technical issue could not be fixed. ASX would therefore then have announced that the market would not re-open that day.
[27] The proposed new order confirmation service discussed in section 2 will provide sufficient information to permit the deletion of all orders using this service.
[28] ASX understands that as part of the initiation process to initiate an ASX Participant's application that interacts with ASX Trade, certain queries may routinely be run against ASX Trade to establish a view of reference data and market data. These queries may be unreliable in an incident scenario. This could prove particularly problematic if the application is disconnected from and has to reconnect to ASX Trade during the incident.
[29] In the September 2016 and November 2020 incidents, queries against the output of the matching engines impacted in each incident would have been impacted in a similar way to the private data broadcasts.

Activity	ENQUIRE	CANCEL_ONLY	ADJUST
Trade reporting	NO	NO	YES
Message acknowledgments	YES[30]	YES[31]	YES
System broadcasts and responses			
Market data (OMNet, ITCH)	NO	NO[32]	YES
Private data (OMNet, OUCH)	NO	NO	YES

Like ENQUIRE, ASX will only use CANCEL_ONLY during incidents.

4.4 Use of OMNet during CANCEL_ONLY

This subsection describes the proposed operation of CANCEL_ONLY for OMNet users and should be read in conjunction with the following documentation available on ASX's website[33];

- ASX Trade Transactions ("**ASXT Transactions**");
- ASX Trade Broadcasts ("**ASXT Broadcasts**");
- ASX Trade Open Interface Function Calls ("**ASXT OI Calls**"); and
- ASX Trade Queries ("**ASXT Queries**").

Summary behaviour

- Deletions via OMNet will function as normal from submitting ASX Participants' perspective but there will be no corresponding private data BO5 Broadcast:
  - an existing message flow is proposed below as an alternative source of transaction confirmations.
- There will be no corresponding market data.

Permitted transactions

The following transaction will be permitted:

- MO4 Delete Order ("**MO4**", section 13, ASXT Transactions[34]):
  - MO4 is a highly flexible transaction that supports cancellation of individual orders or groups of orders with common characteristics.
  - MO4 also supports cancellation of individual quotes or groups of quotes.
  - Whilst MO4 is an OMNet transaction:
    - individual orders entered via OUCH can also be cancelled via MO4 where the order_number_u[35] is known; and

[30] This may result in a response with error code "-110023" - Illegal transaction at this time for transactions not permitted in ENQUIRE.
[31] This may result in a response with error code "-110023" - Illegal transaction at this time for transactions not permitted in CANCEL_ONLY.
[32] Subsystems broadcasting incorrect or incomplete data are likely to be shut down.
[33] https://www.asxonline.com/public/documents/asx-trade-technical-library.html.
[34] https://www.asxonline.com/content/dam/asxonline/public/documents/asx-trade-refresh-manuals/asx-trade-transactions.pdf.
[35] This information will be provided in the Order Confirmation file discussed in section 2.4.

- OUCH orders will be cancelled where they meet the selection criteria for a bulk cancellation.

No other transactions will be permitted. Specifically, the following transactions will not be permitted:

- MO1 Single Order Insert (section 11, ASXT Transactions).
- MO3 Single Order Update (section 12, ASXT Transactions).
- MO36 Two Sided Price Quotation Block Entry (section 14, ASXT Transactions).
- MO37 Two Sided Price Quotation (section 15, ASXT Transactions).
- MO75 Trade Report (section 18, ASXT Transactions).
- MO76 Two Sided Trade Report (section 19, ASXT Transactions).

Private data

Private data broadcasts may be suppressed including:

- BO5 Firm Order Book ("**BO5**", section 13, ASXT Broadcasts[36]).

These broadcasts may not be observed in response to MO4 messages submitted in CANCEL_ONLY.

Market data

Public market data broadcasts will be suppressed including:

- BO2 Order Book Changes ("**BO2**", section 12, ASXT Broadcasts).

These broadcasts will not be observed in response to any order cancellation messages[37] submitted in CANCEL_ONLY. The published view of order books in ASX Trade (as established from prior BO2 broadcasts) will remain frozen at the point at which ASX Trade was placed in ENQUIRE.

Consequently, if ASX Trade is placed into CANCEL_ONLY session state, in order to re-establish an accurate public view of all order books, OMNet users would be required to undertake a full download of all orders once ASX has advised it is safe to do so (MQ7 Total Order Book Query – section 40, ASXT Queries).

Use of the OMNet call return code

The omniapi_tx_ex routine (section 3.6, ASXT OI Calls[38]) is used for entering the transactions defined in ASXT Transactions, including MO4 transactions. The OMNet functional call response ("**OMNet ack**") is independent of the associated private data and market data broadcasts.

The OMNet ack provides a return code *cstatus* ("***cstatus***") and *txstat* that offers definitive information about the success (or otherwise) of the transaction and certain other further information about the transaction[39]. This return code is generated on a path that is less susceptible to incidents.

ASX suggests that, in the absence of BO5 messages, to systematically manage their orders in CANCEL_ONLY, ASX Participants can use *cstatus* and *txstat* as an alternative to key elements of the content provided in the BO5 Firm Order Book message – in particular, as a definitive confirmation that the order has been deleted (or otherwise).

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[36] https://www.asxonline.com/content/dam/asxonline/public/documents/asx-trade-refresh-manuals/asx-trade-broadcasts.pdf
[37] OMNet MO4 or OUCH X or Y
[38] https://www.asxonline.com/content/dam/asxonline/public/documents/asx-trade-refresh-manuals/asx-trade-open-interface-function-calls.pdf
[39] There is no equivalent "ack" message in OUCH. Status information is provided in the relevant OUCH response message.

There are no changes proposed to the OMNet functional call or to *cstatus* or *txstat*. This is existing behaviour already present in all current sessions states and is not specific to incidents[40]. ASX is identifying that *cstatus* and *txstat* may provide an alternative source of systematic messaging in relation to OMNet transactions.

MO4 used to cancel a single order

MO4 may be used to cancel a single order entered via OMNet or OUCH by specifying the order identifier of the order to be deleted.

The potential *cstatus* and *txstat* values are:

- a negative value: the transaction was unsuccessful. The value indicates the reason for failure.
- zero: the transaction was successful but the order was not found.
- a positive value: the transaction was successful. The value in *txtstat* indicates the quantity deleted.

Where the ASX Participant wishes to confirm the quantity of a deleted order, that order should be individually deleted.

MO4 used to cancel multiple orders

MO4 may be used to cancel multiple orders including orders entered via OMNet and OUCH by specifying certain characteristics of the orders to be deleted.

The potential *cstatus* and *txstat* values are:

- a negative value: the transaction was unsuccessful. The value indicates the reason for failure
- zero: the transaction was successful but the orders were not found
- a positive value: the transaction was successful. The value in *txstat* indicates the number of orders deleted

This method is the most efficient approach to cancel multiple orders. However, the ASX Participant will not receive a specific response in relation to each order.

4.5 Use of OUCH during CANCEL_ONLY

The proposed operation of CANCEL_ONLY for OUCH users should be read in conjunction with the following documentation available on the ASX website[41];

- ASX Trade OUCH Message Specification ("**ASXT OUCH Spec**").

Summary behaviour

- deletions via OUCH will function as normal from the perspective of the ASX Participants, including private data flows
- there will be no corresponding ITCH or OMNet market data

Permitted transactions

The following transactions will be permitted:

- Cancel Order Message ("X") (section 2.2.3, ASXT OUCH Spec):

[40] As such this approach could therefore be used at all times.
[41] ASX Trade technical library

- the Cancel Order Message can only be used to cancel orders entered via the same OUCH session; and

- Cancel By Order ID Message ("Y") (section 2.2.4, ASXT OUCH Spec):
  - the Cancel By Order ID Message can only be used to cancel orders entered via the same OUCH session.

No other transactions will be permitted. Specifically, the following transaction will not be permitted:

- Enter Order Message ("O") (section 2.2.1, ASXT T OUCH Spec)
- Replace Order Message ("U") (section 2.2.2, ASXT OUCH Spec)

Private data

The following message responses will be supported:

- Order Cancelled Message ("C") (section 2.3.4, ASXT OUCH Spec).

The C Message provides details of the cancelled order. There is no change from existing behaviour.

4.6 Allow OUCH to cancel any Participant order by ID

Given sufficient Participant interest, ASX would consider changing OUCH to support the cancellation of any order entered under the PID using the order ID. This would mean that a single OUCH session using the information from the ODS file could be used to cancel either all or a subset of orders for that PID regardless of what user session or protocol was used to enter them.[42]

4.7 Use of ITCH during CANCEL_ONLY

This subsection describes the proposed operation of CANCEL_ONLY for ITCH subscribers and should be read in conjunction with the following documentation available on ASX's website[43];

- ASX Trade ITCH Message Specification ("**ASXT ITCH Spec**").

Summary behaviour

- No market data will be published corresponding to submitted deletions.

Market data

The following market data messages will be suppressed:

- Order Delete Message ("D") (section 2.6.2.4, ASXT ITCH Spec[44]).

These multicast messages will not be observed in response to order cancellation message submitted in CANCEL_ONLY. The view of order books in ASX Trade, as established from previously published ITCH messages, will remain frozen at the point at which ASX Trade was placed in ENQUIRE.

Consequently, if ASX Trade is placed in CANCEL_ONLY, in order to re-establish an accurate public view of all order books ITCH users should use the Glimpse service once ASX has advised it is safe to do so (section 3, ASXT ITCH Spec).

[42] This feature would only support cancellation by Order ID. Cancellation using OUCH token would still require the same user session that entered the order.
[43] ASX Trade technical library`
[44] https://www.asxonline.com/content/dam/asxonline/public/documents/asx-trade-refresh-manuals/asx-trade-itch-message-specification.pdf

4.8 Cancellation Possibilities in CANCEL_ONLY

The table below sets out the cancellation paths offered in CANCEL_ONLY. The table shows the response message for each cancellation path.

ASX Participants are reminded that when used for bulk cancellation, the MO4 message does not provide individual order identifiers in the response message.

	Order cancelled by	MO4 – single	MO4 – bulk	OUCH X	OUCH Y
Order entered via	Order identifier	Order ID	Filter	Order Token	Order ID
OMNet					
MO1 / MO3		OMNet ack	OMNet ack	Not possible	Not possible
MO36 / MO37		OMNet ack	OMNet ack	Not possible	Not possible
OUCH					
O		OMNet ack	OMNet ack	C	C

Individual cancellation vs. bulk cancellation

During an incident where CANCEL_ONLY is available ASX strongly recommends that ASX Participants should consider deleting orders individually via:

- MO4 – single;
- OUCH X; or
- OUCH Y.

ASX makes this recommendation because this approach:

- will result in an explicit confirmation at order level;
- is dependent only on basic cancellation functionality; and
- will always be available in CANCEL_ONLY.

Potential restriction on MO4 – bulk in CANCEL_ONLY

Bulk cancellations via MO4 are dependent on extended cancellation functionality and as a consequence, potentially more prone to issues in an incident[45].

If bulk cancellation is impacted by an incident but individual cancellation is available, ASX will move to CANCEL_ONLY and advise ASX Participants that bulk cancellations should not be used.

4.9 Cancel on Disconnect

A number of Participants, in discussions with ASX and in responses to Consultation 1 expressed a desire for a 'guaranteed' CoD service. This section discusses the nature of CoD and reiterates why a 'guaranteed' service is not currently possible. ASX's proposed CANCEL_ONLY session offers an alternative in scenarios other than those where all orders are lost.

[45] This was the case in the November 2020 incident. Individual deletions were reliable; bulk deletions were not reliable.

Cancel on Disconnect architecture

An ASX Trade process monitors ASX Participants' user connections to OUCH and OMNet gateways to identify certain events:

- a configured number of missed heartbeats from the connected user
- a logout by the connected user
- a "connection reset by peer" by the connected user[46]

When detected, these events trigger a CoD event in accordance with the pre-configured settings on the affected session. Where configured, the monitoring process sends a bulk cancellation request[47] to the matching engine reflecting the pre-configured settings. The matching engine acts on this request when it is received[48].

The success, or otherwise, of the cancellation request is dependent on whether cancellation functionality in the matching engine is working correctly at the time the request is processed[49].

The accuracy of any related market data and private data resulting from the cancellation request is dependent on whether the associated broadcast functionality in the relevant OUCH, OMNet and ITCH processes is working correctly at the time the broadcast is processed[50].

Optimistic nature of Cancel on Disconnect

In order to have certainty that any interaction with ASX Trade[51] has been processed successful, the initiating ASX Participant should:

- be certain that ASX Trade is operating correctly; and
- analyse the response message to the interaction.

In normal operations, ASX Participants assume that ASX Trade is operating correctly:

- during normal operations that is a robust assumption; and
- during an incident affecting ASX Trade that is not a robust assumption.

In normal operations, ASX Participants may also choose to assume that the outcome of an interaction is as anticipated before it has been verified:

- during normal operations that is an optimistic assumption that may be reasonable; and
- during an incident affecting ASX Trade that remains optimistic, but is less likely to be reasonable.

CoD is - by its very nature - an optimistic process that can only be verified after the current status of orders in ASX Trade has been determined.

[46] A RST packet has been received by ASX on the TCP connection between ASX and the connected user and gateway.
[47] This is a different message from that used by ASX Participants. However, the matching engine deletion functionality is common between deletes initiated by ASX Participants, ASX's operations team and Cancel on Disconnect.
[48] As is the case with all instructions sent to the matching engine.
[49] In the November 2020 incident, bulk deletion functionality was not working correctly. In order to remedy this issue, Centre Point functionality was disabled on 22 November 2020. The issue was resolved by a software fix on 2 December 2020 and Centre Point functionality was re-enabled on 5 December 2020.
[50] In the November 2020 incident, OMNet broadcast functionality was not working correctly for instruments in matching engine 3. In order to remedy this issue, generation of bait orders from Tailor-Made combinations was disabled on 21 November 2020. Bait generation remains disabled.
[51] Or any other trading platform.

ASX Participants quite rightly assume CoD[52] is reliable in normal operations. However, ASX cannot guarantee CoD[53] is reliable during an incident affecting ASX Trade – particularly when ASX is investigating the impact of an issue and ASX Trade is in ENQUIRE.

Cancel on Disconnect in CANCEL_ONLY

CoD will be enabled in CANCEL_ONLY.

The CoD process is dependent on extended cancellation functionality. ASX may advise that cancel on disconnect is unreliable in CANCEL_ONLY if bulk cancellation functionality is impacted[54].

ASX proposes to develop and configure a new cancel only session state for use during incidents. This will allow the cancellation of working orders without relying on normal broadcast responses which may have been corrupted. In this scenario, certain system broadcasts may be disabled where there is no certainty they are functioning correctly.

Question 4.1: Are you supportive of this proposal?

Question 4.2: If so, how would you make use of the service?

Question 4.3: Please provide any other feedback you have regarding this proposal including the level of change required for you to support and make use of this session state?

[52] And all other ASX Trade functionality
[53] Or other ASX Trade functionality
[54] This was the case in the November 2020 incident – bulk deletion functionality was impacted by the incident; individual deletion functionality was operating normally.

5. Intraday restart

5.1 Background

ASX's current practice for the most severe ASX Trade incidents which result in data corruption is to recover ASX Trade overnight. REP 708 expectation 5 asks AMOs to consider the possibility of an *intraday reboot of key trading systems*. This section discusses the concept of an intraday restart of ASX Trade.

ASX recognises this is a non-trivial change for both ASX and ASX Participants. ASX is currently assessing the internal implications of this proposal and now seeks corresponding stakeholder feedback.

It is ASX's view, given the experience of the September 2016 incident and the November 2020 incident, that the most likely path to successful resumption of the ASX market on the day of the incident in similar circumstances would be an intraday restart as discussed in this section. In the absence of such a capability, it is most likely that the ASX market would not resume – as in those incidents – until the start of the subsequent business day.

5.2 Business objectives

The objective of this proposal is to provide a recovery model that:

- is **timely**
  - can be executed by the agreed cut-off time of 1:30pm
- **facilitates market resumption** by affording ASX the ability to:
  - preserve long orders, where possible
  - remediate functional issues
  - re-establish accurate market data and private data
- has **minimal impact** on ASX Participants:
  - from the ASX Participant perspective, the process for an intraday restart should be **as similar as possible to the existing process** followed in the event of a disconnection[55]
  - ASX's analysis, set out in more detail below, suggests some impact is likely to be unavoidable

5.3 Order retention – potential outcomes

During an incident, ASX strives, where possible, to preserve long orders that are present in ASX Trade. ASX successfully preserved long orders in both the September 2016 incident and the November 2020 incident. Day orders were purged as part of the standard end of day process.

When considering the potential outcomes of an intraday restart, two outcomes of order retention could be observed which are set out in the table below. There is no intraday recovery model in which OUCH orders and OMNet day orders can be preserved[56] - the principal distinction is therefore the impact on long orders entered via OMNet.

[55] ASX assumption on reconnection: query reference data; connect to live feeds; query orders, query trades, query market data; apply live feed

[56] OUCH orders were purged in the 2016 and 2020 outages. OUCH orders are day only orders and purged as part of the shutdown process. As such OUCH orders would also be lost in an intraday restart.

Order	Outcome 1 "Long orders retained"	Outcome 2 "All orders lost"
OUCH[57]	Purged	Purged
OMNet – day orders	Purged	Purged
OMNet – long orders	Preserved	Purged

Outcomes 1 and 2 are also potential results of the existing overnight recovery process. Outcome 1 occurred in the September 2016 incident and the November 2020 incident.

If intraday restart had been available in the September 2016 and November 2020 incidents the consequence would also have been outcome 1[58].

The principal distinction between what was observed in the November 2020 incident and what could have occurred if intraday restart was available is therefore on timing:

- in the November 2020 incident, an accurate position of Participants orders was made available to ASX Participants at 2.25am on the day following the incident; and
- if intraday restart were available, ASX estimates an accurate position of Participants orders could have been made available to ASX Participants at approximately 1.00pm on the day of the incident.

5.4 Comparison of overnight restart with intraday restart

A simplified view of the current ASX Trade overnight restart process is set out below identifying where additional steps are applied in an incident (shown in blue). The table also identifies how those steps compare to the proposed intraday restart process including where steps are unchanged (shown in green) and or are changed or new (shown in red). Areas of change are discussed in the following subsections.

Activity	Overnight process	Intraday recovery process	
Disable ASX Participant interactions	6.50pm	At time advised by ASX	
"End of day" processes			
OUCH orders	Purged	Lost[59]	
OMNet – day orders	Purged	Lost[60]	
OMNet – long orders	Preserved	Preserved	where possible[61]
Trades, including ITNs	Preserved	Preserved	where possible[62]
Intraday reference data changes	Preserved	Preserved	

[57] There are no intraday restart scenarios in which OUCH orders will be retained.
[58] Notwithstanding only matching engine 3 was impacted at the time ASX Trade was placed in ENQUIRE, day orders in all matching engines would have been deleted during the intraday restart.
[59] OUCH orders cannot be preserved as part of an intraday recovery process.
[60] OMNet day orders cannot be preserved as part of an intraday recovery process.
[61] OMNet long orders will be preserved where possible. ASX proposes that intraday recovery will **NOT** continue if it is not possible to preserve OMNet long orders. Instead, ASX will recover overnight.
[62] Trade history will be preserved where possible. ASX proposes that intraday recovery **WILL** continue if it is not possible to preserved trade history.

TMC instruments	Purged	Preserved
INCIDENT: Session states	n/a	Preserved[63]
"Overnight" processes		
Add/remove instruments	As required	Not required[64]
INCIDENT: Apply configuration changes	As required	As required
Shut down ASX Trade	Required	Required
Apply configuration to increment trading day	Required	Not required[65]
INCIDENT: Deploy application changes	As required	As required
INCIDENT: Adjust TSN	n/a	Required[66]
"Start of day" processes		
Restart ASX Trade	Required	Required
Restore long orders	Required	Required where possible
Validate system	Required	Required
Validate system data	Required	Required
Enable ASX Participant interactions	2.25am	At time advised by ASX

5.5 Comparison of intraday reconnection with intraday restart

The table below considers the observed behaviour during a typical intraday disconnection event and compares it to the behaviour that would be observed in the proposed intraday restart process.

The table identifies ASX's initial assessment of whether each consideration would appear the same from the perspective of an ASX Participant (shown in green) or may differ (shown in red). These assessments are discussed further in the following subsections.

Activity	Disconnect/reconnect expectation	Intraday recovery
Orders and order management		
OUCH orders	Dependent on configuration of Cancel on Disconnect	All orders lost[67]
OUCH session	Connect Same Session ID	Connect New Session ID[68]
OMNet – day orders	Dependent on configuration of Cancel on Disconnect	Lost

[63] The intention being that the system will return in the session states in which it was shut down. The market is likely (but not guaranteed) to have been in ENQUIRE during the incident, so it would move back into ENQUIRE as part of the intraday recovery process and this would be followed by the standard resumption sequence. .From the ASX Participants perspective, the reconnection will appear the same as if the ASX Participant themselves had disconnected and reconnected.
[64] Any such changes will be applied during the subsequent overnight process.
[65] Not required to ensure system returns with the same trading day.
[66] Required to ensure Trade slip numbering does not reset and resumes higher than the last used prior trade slip number. TSN will not be duplicated although there may be a gap.
[67] No 'C' response message on reconnection.
[68] New session ID in the Login Accept message.

OMNet – long orders	Dependent on configuration of Cancel on Disconnect		Preserved	where possible
OMNet session	Connect	Same Session ID	Connect	Same session ID
Market data				
OMNet session	Connect	Same Session ID	Connect	Same session ID
ITCH session	Connect	Same Session ID	Connect	New session
Trades				
Trades	Available		Available	where possible
Trade slip number	Continue from previous		Continue[69]	
ITNs	Available		Available	
Reference data				
Instrument changes	As applied		As applied	
TMC instruments	As created		Preserved	
Session states - scheduled	As scheduled		ENQUIRE	
Session states - overrides	As applied		As applied	

5.6 Orders and order management

This section describes the observed order and order management behaviour during an intraday recovery and compares with existing intraday disconnection and overnight restart.

OUCH

All OUCH orders will be lost. There will be no private messages in relation to these orders. This is the same behaviour observed by an OUCH user that, in normal operations, disconnects after the end of the trading day (4.11pm) and before the end of the interactive session (6.50pm).

ASX understands that many OUCH users configure CoD to cancel all orders in the event of a connection loss. In such circumstances, if the OUCH user reconnects on the same trading day private messages confirming the cancellation will be received. Private messages are not received if the next connection by that user is on the following trading day.

Scenario	Order cancellation	Private message	Trading session
Disconnect/reconnect same trading day	Per CoD configuration	YES	Same day
Standard overnight process	All orders removed	YES / NO[70]	Next day
Proposed: Intraday restart	All orders removed	NO	Same day

[69] This will require a change to ASX Trade. The next TSN will be higher but there may be a gap.
[70] Yes if the user remains connected after 6.50pm; No if the user disconnects before 6.50pm.

OMNet

ASX will attempt to preserve all long orders where possible. Day orders will not be preserved.

Where orders are lost there will be no corresponding private messages.

ASX understands that many OMNet users do not configure CoD to cancel orders in the event of a disconnection. In such circumstances, if the OMNet user reconnects on the same trading day all orders will be as they were subject to any executions that may have occurred if the disconnection occurred during a trading session.

Scenario	Order cancellation	Private message	Trading session
Disconnect/reconnect same trading day	Per CoD configuration	YES	Same day
Standard overnight process	Long order retained Day orders removed	YES	Next day
Proposed: Intraday restart	Per incident	NO	Same day

5.7 Market data

This section describes the observed market data behaviour during an intraday recovery and compares with existing intraday disconnection and overnight restart.

ASX generally anticipates that an intraday restart is likely to be catered for by current market data recovery processes.

OMNet

The proposed ASX intraday recovery process will re-establish an accurate position for market data. This is likely to differ from the position derived from the OMNet market data observed prior to and during the incident. All OMNet market data subscribers should therefore re-establish an accurate market data position in their own systems.

On reconnection, the sequence number for market data messages will be reset.

Market data applications that are coded on recovery to delete historic data[71] are likely to be able to use existing application behaviour on intraday restart.

Scenario	Approach	Day	Sequence numbers
Disconnect/reconnect same trading day	Recovery	Same day	Continue
Standard overnight process	Initialisation	Next day	Restart
Proposed: Intraday restart	Recovery	Same day	Restart

ITCH

The proposed ASX intraday recovery process will re-establish an accurate position for market data. This is likely to differ from the position derived from the ITCH market data observed prior to and during the

[71] ASX anticipates that is a standard step in a market data recovery process.

incident. All ITCH market data subscribers should therefore re-establish an accurate market data position in their own systems.

During the restart process an End of Session message[72] will be sent with the current ITCH Session ID. This indicates that there will be no more messages on that session[73]. On reconnection, there will be a new ITCH Session ID and the sequence number for market data messages will be reset.

Market data applications that are coded to either the End of Session message or to recognise a change in Session ID are likely to be able to use existing application behaviour on intraday restart. Market data applications that are coded to timings[74] will likely need to be amended.

Scenario	Approach	Session	Sequence numbers
Disconnect/reconnect same trading day	Recovery	Same session	Continue
Standard overnight process	Initialisation	New session	Restart
Proposed: Intraday restart	Recovery	New session	Restart

5.8 Session states

An intraday restart would occur whilst the ASX markets are in ENQUIRE[75]. On restart, the ASX markets would initially remain in ENQUIRE and then proceed to the standard resumption sequence.

Individual instruments may be in session states that have been applied during the trading day – typically in response to an event relevant to the issuer[76]. Whilst ENQUIRE or CANCEL_ONLY (set at ASX market level) will override the functional behaviour permitted in those session states (set at instrument level), the states themselves provide a pointer to potential further information relevant to the issuer. Any such instrument level session states will be preserved during the intraday restart[77].

Scenario	Session state at time of disconnection	Session state at time of reconnection
Disconnect/reconnect same trading day	Per normal schedule	Per normal schedule[78]
Standard overnight process	Per normal schedule	Per normal schedule
Proposed: Intraday restart	ENQUIRE	ENQUIRE[79]

[72] ASXT ITCH Appendix 2, section 5.4.3 (Nb. only available if the ITCH processes are not impacted).
[73] Requires ITCH to not be an affected protocol by the outage to be able to send EndOfSession message.
[74] ASX generally recommends ASX Participants and ASX subscribers applications make use of explicit ASX Trade messaging rather than hard-coding to assumed timings.
[75] If the CANCEL_ONLY proposal described in section 4 proceeds to implementation, ASX would place all markets into ENQUIRE before intraday restart commences. Assumes the Session Manager (SM) is working (Nb. SM is Session Manager, responsible for sessions state changes).
[76] SUSPEND, PRE_NR, TRADING_HALT, REG_HALT. Set out in section 9.2.6, ASX Trade Introduction and Business Information - LINK
[77] Subject to the expiry of any such sessions states at the scheduled times.
[78] Depending on the rapidity of reconnection, this may be a different session state to that prevailing at the time of disconnection.
[79] Assuming a reconnection within a reasonable time.

5.9 Trades

New trades

On resumption of trading, ASX Trade will commence executing orders and accepting reports of trades submitted by ASX Trade participants. Resultant execution and reports of trades will continue to be identified by:

- Match ID – this is a lifetime unique number and is unaffected by the restart
- Trade number – will continue to increment after the restart[80]
- Trade Slip Number (TSN) – will continue to increment after the restart

Scenario	Match ID	Trade number[81]	TSN[82]
Disconnect/reconnect same trading day	Lifetime unique	Continues	Continues
Standard overnight process	Lifetime unique	Resets	Continues
Proposed: Intraday restart	Lifetime unique	Continues	Continues

Facilitated Specified Size Block Special Crossing ("FSSBSC") Trade Reporting[83]

Initial Trade Notifications ("**ITNs**") of FSSBSC trades may have occurred prior to the intraday restart. All such ITNs will be preserved through the intraday restart and will be published in accordance with expected behaviour. There is no change from existing behaviour.

Historic trades

ASX will attempt to preserve all trades from the trading session that is being restarted but this may not be possible. Historic trades are only retained in ASX Trade to service queries. The absence of historic trades would not prevent ASX from proceeding with an intraday restart.

If the proposal for TDS set out in section 3 proceeds to production, trades from the trading session prior to the restart would be available in TDS.

Scenario	Trades from the same day	Trades from the prior day
Disconnect/reconnect same trading day	Available	Available
Standard overnight process	Not applicable	Available
Proposed: Intraday restart	Dependent on incident	Dependent on incident

[80] Trade_number_i in OMNet.
[81] Resets every day.
[82] Resets every 10 days and incorporates the Trade number .
[83] ASXT Intro, page 70

5.10 Instrument Reference data

All changes to instrument reference data relating to non-transient instruments will be persisted.

All Tailor-Made Combination ("**TMC**") instruments will be persisted. Orders relating to TMC instruments are considered day orders and will be treated in the same manner as other day orders as described in section 5.6.

Scenario	Tailor-made combinations	Other instruments
Disconnect/reconnect same trading day	Available	Changes persisted
Standard overnight process	All removed	Changes persisted
Proposed: Intraday restart	Changes persisted	Changes persisted

ASX proposes to explore developing and testing the ability to restart ASX Trade within a trading day and resume the market following an incident.

Question 5.1: Are you supportive of this proposal?

Question 5.2: Do you believe an intraday restart would be of benefit to the market?

Question 5.3: Describe any system impact(s) you foresee and the effort required for you to support an intraday restart of ASX Trade?

Question 5.4: Please provide any further feedback you have including any estimated timeframes it would take were ASX Trade restarted intraday for you to be 'back online' and ready to trade?

6. Disabling Order Types or Market Components

6.1 Background

REP 708 expectation 6 required Market Operators to document the circumstances under which particular order types or market components will be disabled, as well as the notice period before these changes are made. This includes procedures for changes before market open as well as intraday. There are no specific consultation questions in this section, rather detail is provided for information and reference.

6.2 Summary

In the event of an incident impacting ASX Trade, the recovery process may require certain ASX Trade functionality to be disabled (temporarily or permanently).

ASX recognises that the unavailability of functionality within ASX Trade may impact operational and technical processes for ASX Participants and other stakeholders. Further, the process of making the change to the availability of functionality, which is not something that is routinely observed, may in itself present challenges.

The following table provides a summary describing the key high level functionality[84] that ASX is capable of wholly or partially disabling the circumstances in which it may be disabled and the minimum notice period ASX would provide in such circumstances:

Function	Description	Circumstances for disabling	Min Notice Period[85]
Order Types and Controls	Settings controlling order behaviour such as execution, pricing, time validity and quantity disclosure.	An issue with the specific order type which if continued to be used may adversely impact: • the stability of the ASX Trade platform • the ability of ASX to operate a FOT market • the accuracy of ASX Trade disseminated private and/or public market data	2 hours[86]
Centre Point	Order types that are available for 'dark execution'.		
Tailor-Made Combinations (TMC)	Creation and entry of orders into user defined combination instruments.	An issue exists with TMC creation/orders which if continued to be used may adversely impact: • the stability of the ASX Trade platform	1 hour

[84] This is not a comprehensive list of ASX Trade functionality. Rather, it is a list of key functionality that might be pertinent to a decision to open ASX markets.
[85] This is the notice period pertaining to the proposed change. Additional time may be required to complete any configuration to disable functionality/components.
[86] Where possible, ASX would endeavour to notify the market before 8:00am to allow the necessary configuration to be made prior to the normal 10:00am market open. If this is not possible, ASX will consider if a delay to the market open is necessary (or not) and will provide notification of a delayed open prior to 9:30am.

		• the ability of ASX to operate a FOT market • the accuracy of ASX Trade disseminated private and/or public market data	
Quotes	Two sided quotation messages used for market making.	An issue exists with the quoting function which if continued to be used may adversely impact: • the stability of the ASX Trade platform • the ability of ASX to operate a fair and transparent market • the accuracy of ASX Trade disseminated private and/or public market data	1 hour
Trade Reporting	Facility for the reporting and publication of off market trades.	An issue exists with the trade reporting function which if continued to be used may adversely impact: • the stability of the ASX Trade platform • the ability of ASX to operate a FOT market • the accuracy of ASX Trade disseminated private and/or public market data	Immediate

Additional detail is provided in Appendix 1 which considers the various functionality and components that can be disabled including; the order types and controls, Centre Point as an order type and the execution venue, TMCs, Quotes, and Trading Reporting.

General Question

Question 6: Are there any additional issues, concerns or ideas relating to the proposals raised in this consultation that might be considered by ASX?

Appendix 1: Disabling Order Types or Market Components

Order types and controls

In ASX Trade, the order types and controls permitted for each Instrument Class and Session State are highly configurable. ASX considers the availability of certain order types such as Limit and Sweep Limit[87] orders to be critical. An incident that has a comprehensive impact on Limit and/or Sweep order types would therefore prevent the opening of the ASX markets, or lead to a general pause in the ASX markets if the incident occurred during the Open session state.

In the event of an issue impacting other order types or controls, ASX may look to disable that functionality either intraday or overnight.

ASX estimates the disablement of order types and/or controls as an intraday process will require up to 2.5 hours of elapsed time. The intraday disablement of order types and controls would not be performed whilst execution is enabled.

Centre Point

The term 'Centre Point' is used to refer to two distinct concepts:

- the **order type**; and
- the **execution venue** for dark execution on ASX.[88]

Order type

There are two Centre Point order types – Centre Point and Centre Point Block[89]. Disablement (enablement) of these order types is described below.

Execution venue

Centre Point, Centre Point Block and ASX Sweep orders can all execute 'in Centre Point'. Disablement (enablement) of the execution venue is achieved by preventing any order from resting in that venue. This requires the prevention of resting orders of the following types:

- Centre Point;
- Centre Point Block; and
- ASX Sweep Dual Post.[90]

In practice, this is achieved by:

- disabling Centre Point and Centre Point order types:
    - the identical action to that required for **order type** and is described below;

[87] Sweep Limit - In one transaction, seamlessly interact with dark liquidity in ASX Centre Point and lit liquidity in ASX TradeMatch. Remaining liquidity rests in ASX TradeMatch. ASX Sweep offers the fastest possible routing between these two liquidity venues for aggressive order flow whilst minimising routing signals and increasing execution certainty.
[88] ISO20022 Market Identifier Code (MIC) ASXC.
[89] Centre Point orders were introduced first and are vanilla in nature providing access to mid-point and other permitted price steps inside the NBBO and with no order controls. Centre Point Block orders were introduced later and provide access to the full suite of order controls.
[90] All ASX Sweep orders rest in the lit market; only ASX Sweep Dual Post orders rest in the dark market. ASX Sweep Dual Post simultaneously rest orders in ASX Centre Point and ASX TradeMatch at limit +1/2 tick with no risk of over fill.

- advising ASX Participants to not use ASX Sweep dual post orders[91]:
    - there is no control available on this specific functionality as set out below;
- ASX Operations team proactively monitor for ASX Sweep dual post orders and seek the removal of any that are submitted; and
- executions in the Centre Point order book resulting from ASX Sweep dual post orders would be assessed for cancellation.

Criticality
ASX considers Centre Point functionality to be highly desirable but not critical. The absence of the Centre Point order type(s) or the execution venue would not prevent ASX from opening the ASX markets.

Tailor-Made Combinations (TMCs)

A Tailor-Made Combination is a user defined combination security of up to 4 legs which can variously be:

- traded as an instrument itself (**TMC to TMC matching**)
- traded against the component legs where liquidity in the legs satisfy in full the makeup of the TMC (**TMC to leg matching**)
- traded via a synthetic implied order ("**bait order"**)[92] generated by ASX Trade in a leg instrument where other legs already satisfy the makeup of the TMCs

Each row on the table below represents a separate TMC functional behaviour that may be independently disabled (enabled) by ASX.

Disabling TMC functionality

Disabling TMC functionality is supported both intraday and overnight.

ASX estimates the disablement of one or more element of TMC functionality as an intraday process will require between 1 and 3 hours of elapsed time. This time will vary depending on how many TMCs and orders in TMCs exist at the time the change is made.

Disabling TMCs

In practice, ASX will disable TMC functionality by:

- preventing the creation of new TMC instruments;
- preventing the creation of new orders in TMC instruments; and
- deleting all existing orders in TMC instruments

ASX estimates the disablement of TMC functionality as an intraday process will require between 1 and 3 hours of elapsed time. This time will vary depending on how many TMCs and orders in TMCs exist at the time the change is made.

[91] Only a small number of ASX Participants actively use ASX Sweep dual post orders.
[92] Bait functionality was disabled as a consequence of the November 2020 incident and remains disabled. Prior to that time, this functionality was responsible for less than 1% of all executions involving TMCs.

Functionality	Current position	Notes
TMC creation	Enabled	Maximum of 4000 per day
TMC order entry	Enabled	
TMC – TMC matching	Enabled	
TMC – leg matching	Enabled	
Bait generation	Disabled	

Criticality

ASX considers TMC functionality to be highly desirable but not critical. The absence of some or all TMC functionality would not prevent ASX from opening the ASX markets.

Quotes

ASX Trade supports the entry of two-sided quotation messages for market makers only[93]. Quotes may be submitted:

- in bulk – up to 14 instruments – using the MO36 Two Sided Price Quotation Block Entry[94] transaction (**MO36**); or
- an individual instrument – using either the MO37 Two-Sided Price Quotation[95] transaction (**MO37**) or the MO36 with only a single instrument.

Disabling Quotes

Disabling and enabling quote functionality is supported both intraday and overnight.

In practice, ASX will disable quoting functionality by preventing ASX Participants from using the MO36 and MO37 transactions. ASX Participants that attempt to use these transactions when they are disabled will receive a rejection.

ASX estimates the full disablement of quote functionality as an intraday process will require approximately 30 minutes of elapsed time. ASX further anticipates that this action could take place under a localised pause of trading in the affected markets rather than a general pause of all ASX markets[96].

Criticality

ASX considers quote functionality to be highly desirable but not critical. The absence of quote functionality would not prevent ASX from opening the ASX markets. ASX may elect to vary or waive obligations on market makers where quote functionality is unavailable.

[93] Market makers may also use single orders for market making.
[94] Section 14, ASXT Transactions.
[95] Section 15, ASXT Transactions.
[96] Quotes are only enabled for certain markets. Trading may therefore be paused in the Equity Options or Index Options market for example, but the remaining markets on ASX Trade would remain open.

Trade Reporting

ASX Trade supports the reporting and publication of off market trades executed by ASX Participants[97]. Reports of trades may be submitted and managed using the:

- MO75 Trade Report[98] transaction (**MO75**);
- MO76 Two Sided Trade Report[99] transaction (**MO76**);
- MO77 Combination Trade Report[100] transaction (**MO77**); and
- MO74 Delete Unmatched Trade Report[101] transaction (**MO74**).

Disabling Trade Reporting

Disabling and enabling trade reporting functionality is supported both intraday and overnight.

In practice, ASX will disable trade reporting functionality by preventing ASX Participants from using the MO74, MO75, MO76 and MO77 transactions. ASX Participants that attempt to use these transactions when they are disabled will receive a rejection.

ASX estimates the full disablement of trade reporting functionality as an intraday process will require approximately 15 minutes of elapsed time. ASX further anticipates that this action could take place without a general pause of all ASX markets.

Criticality
ASX considers trade reporting functionality to be highly desirable but not critical. The absence of trade reporting functionality would not prevent ASX from opening the ASX markets.

Order types

Order behaviour in ASX Trade is defined by a combination of two fields identified in the OMNet protocol[102]:

- *exch_order_type_n* which defines how the order can execute and aspects of the execution behaviour;
- *order_type_c* which defines the pricing requirements and behaviour of the order.

Commonly used terms for 'order types' are shown as **red bold** in the table below. These 'order types' may align with either:

- *exch_order_type_n* – these appear in the leftmost column below; or
- a combination of *exch_order_type_n* and *order_type_c* – these appear in the rightmost column below.

OUCH order types can also be mapped to these OMNet fields[103]and are shown in **blue bold** in the table.

Each row on the table represents a separate 'order type' that may be independently disabled and enabled by ASX.

[97] ASIC MIR - https://www.legislation.gov.au/Details/F2022C00607.
[98] Section 18, ASXT Transactions.
[99] Section 19, ASXT Transactions.
[100] Section 20, ASXT Transactions.
[101] Section 17, ASXT Transactions.
[102] Section 11.3.3, ASXT Transactions.
[103] Appendix 2, ASXT OUCH.

Disabling order types

Disabling and enabling order types is supported both intraday and overnight.

ASX estimates the disablement (enablement) of one or more order types as an intraday process will require up to 2.5 hours of elapsed time. This time will only vary marginally depending on the number of order types.

Generally ASX will disable (enable) order types outside of market hours. However, in an incident, ASX may need to disable order types during market hours. ASX will only disable order types when execution is not enabled.

When an order type is disabled, any ASX Participant sending a transaction in relation to such an order type will receive a rejection.

Criticality

ASX considers that the prevalence of **Limit** order and ASX Sweep Limit order is such that the absence of those order types would prevent ASX from opening the ASX markets.

These critical orders types are indicated by yellow shading in the table below.

ASX considers that the disablement of other order types listed in the table would not prevent ASX from opening the ASX markets.

exch_order_type_n[104]		order_type_c	OUCH[105]	Notes
Lit execution only				
Limit	0 (2)	1	Y	Limit
	0 (2)	3	-	Market to Limit
	0 (2)	17	-	Best Limit
	0 (2)	65	-	Market Imbalance
Price Stabilisation	8 (10)	1	-	Not generally available
Undisclosed	32 (34)	1	-	
Dark execution only				
Centre Point	64 (66)	1	-	Centre Point Limit
	64 (66)	2	-	Centre Point Market
Centre Point Block	4096 (4098)	1	N B F C E	Centre Point Block Limit
	4096 (4098)	2	N B	Centre Point Block Market
Lit and dark execution				
ASX Sweep	2048 (2050)	1	S P T	ASX Sweep Limit
	2048 (2050)	3	S	ASX Sweep Market to Limit

[104] The number in brackets represents the order type when the order is tagged as a short shell. Short sell tagging is not mandated under ASX rules or the MIRs but may assist ASX Participants with other short sell reporting that is mandated under the MIRs.
[105] In OUCH, limit (priced) and market (unpriced) orders are not separate order types but, where supported, are mapped to corresponding separate OMNet order types based on the presence or absence of a price. Consequently OUCH order types N, B and S, which may be priced (= limit) or unpriced (= market) map to two OMNet order types.

Disabling short sell

Short sell is not an order type. However, all other order types support being tagged as a short sell order by incrementing the value of *exch_order_type_n* by 2 as illustrated in the table above.

Disabling and enabling short sell is supported both intraday and overnight.

In the unlikely event that short sell functionality was required to be disabled intraday, the process would require around 2.5 hours of elapsed time.

Order validity

Order validity defines an order's lifetime and some aspects of its permitted execution behaviour.

Order validity in ASX Trade is defined by a combination of two fields identified in the OMNet protocol[106]:

- *time_validity_n* which defines the duration of the order; and
- *block_n* which is used only to identify the 'execute in full' requirement of the Fill or Kill validity.

Commonly used terms for order validities are shown as **red bold** in the table below.

OUCH order validities can also be mapped to these OMNet fields[107]and are shown in **blue bold** in the table.

Each row on the table below that is not shaded grey represents a separate order validity that may be independently disabled and enabled by ASX.

Rows shaded grey cannot be disabled and enabled through configuration.

Disabling order validities

Disabling and enabling order validities, where possible, is supported both intraday and overnight.

ASX estimates the disablement and enablement of one or more order validities as an intraday process will require up to 2.5 hours of elapsed time. This time will only vary marginally depending on the number of order validities.

Generally ASX will disable (enable) order validities outside of market hours. During an incident, ASX may need to disable order validities during market hours. ASX will only disable order validities when matching is not possible.

When an order validity is disabled, any ASX Participant sending a transaction in relation to such an order type will receive a rejection.

Criticality

ASX considers that the prevalence of the following orders validities is such that the absence of those order validities would prevent ASX from opening the ASX markets:

- **Good For Day**; and
- **Good Till Cancel.**

These critical orders validities are indicated by yellow shading in the table below.

ASX considers that the disablement of other order types listed in the table would not prevent ASX from opening the ASX markets.

[106] Section 11.3.3, ASXT Transactions.
[107] Section 2.2.1.2, ASXT OUCH.

Validity	Short name	OMNet			OUCH	Intraday recovery process
		time_validity_n		block_n		
		byte 1	byte 2			
Fill or Kill	FoK	0	0	0	**4**	Execute in full or expire immediately
Fill and Kill	FaK	0	0	1	**3**	Execute as full as possible and expire
Good For Day	Day	1	0	1	**0**	Expires at end of current day
Expire		2	0	1	-	Expires when instrument expires
Good Till Date	Date	5	count	1	-	Expires after (count) days
Good Till Cancel	GTC	6	0	1	-	Does not expire

Other order controls

ASX Trade offers controls that allow ASX Participants to control aspects of the display, price size and nature of execution of orders. In particular:

- display controls:
  - on displayed orders
    - **iceberg**[108] functionality
- price controls:
  - on all orders that can execute in the dark
    - **midpoint**[109]
    - **dark limit**[110] – any permitted dark price up to the user-defined limit
    - any price block or **APB**[111] – dark execution above block size up to the user-defined limit
- size controls:
  - on all orders that can execute in the dark market
    - minimum acceptable quantity or **MAQ**[112]
    - **single fill**[113] only
- execution controls – liquidity access:
  - on all orders
    - unintended crossing prevention or **UCP**[114] – prevents the publication of accidental self-executions
  - for all orders that can execute in the dark
    - **preferencing**[115] self-executions ahead of bilateral executions
  - on ASX Sweep orders
    - access to dark liquidity when resting – **dual post**[116]

[108] Sections 25.5.3 and 25.4, ASXT Intro.
[109] Section 24.1.1, ASXT Intro.
[110] Section 24.1.2, ASXT Intro.
[111] Section 24.1.3, ASXT Intro.
[112] Sections 24.2 and 25.3, ASXT Intro.
[113] Sections 24.2 and 25.3, ASXT Intro.
114 Section 23, ASXT Intro.
115 Sections 24.10, ASXT Intro.
116 Section 25.2, ASXT Intro.

Commonly used terms for the various order controls are shown as **red bold** above and in the table below.

OUCH order types can also be mapped to these order controls[117] and are shown in **blue bold** in the table.

Each row on the table that is not shaded grey represents a separate order control that may be independently disabled or enabled by ASX.

Rows shaded grey cannot be disabled or enabled through configuration.

Disabling order controls

Disabling and enabling order controls is supported both intraday and overnight.

ASX estimates the disablement (enablement) of one or more order controls as an intraday process will require up to 2.5 hours of elapsed time. This time will only vary marginally depending on the number of order controls.

Generally ASX will disable or enable order controls outside of market hours. During an incident, ASX may need to disable order controls during market hours. ASX will only disable order controls when execution is not enabled.

When an order control is disabled, any ASX Participant sending a transaction in relation to such an order control will receive a rejection.

Criticality

ASX considers that an issue affecting the following order functionality would, unless mitigated; prevent ASX from opening the ASX markets:

- **midpoint**, **dark limit** and **APB**; and
- **MAQ** and **single fill.**

These critical orders controls are indicated by yellow shading in the table below. There are no specific configuration controls for these pieces of functionality. However, they all apply only to dark executions.

ASX would therefore mitigate any issues experienced in the above functionality by disabling Centre Point and Centre Point Block[118] orders.

ASX does not consider the following order control functionality to be critical. The absence of these order controls would not prevent ASX from opening the ASX markets.

- **iceberg**
- **preferencing**
- **dual post**
- **UCP**

117 Section 2.2.1.2, ASXT OUCH.

118 ASX Centre Point Block is a centralised Block matching service that combines the liquidity of all market participants. Greater volume discovery is supported via instantaneously executable Block orders, minimising order routing and liquidity search costs, time & effort (see LINK).

Functionality	Applies to	OMNet			OUCH
		Limit	ASX Sweep	CPB	Order types
Display controls					
Iceberg	Order	YES	YES	-	-
Price controls					
Midpoint	Order	-	-	YES	B
Dark Limit	Order	-	-	YES	D F
APB	Order	-	-	YES	C E
Size controls					
MAQ	Order	-	YES	YES	D S P B F T C E
Single Fill	Order	-	YES	YES	B F T E
Liquidity access controls					
UCP	Order	YES	YES	YES	ALL
Preferencing	Participant	-	YES	YES	YES
Dual post	Order	-	YES	-	P

Appendix 2: Incident Playbooks

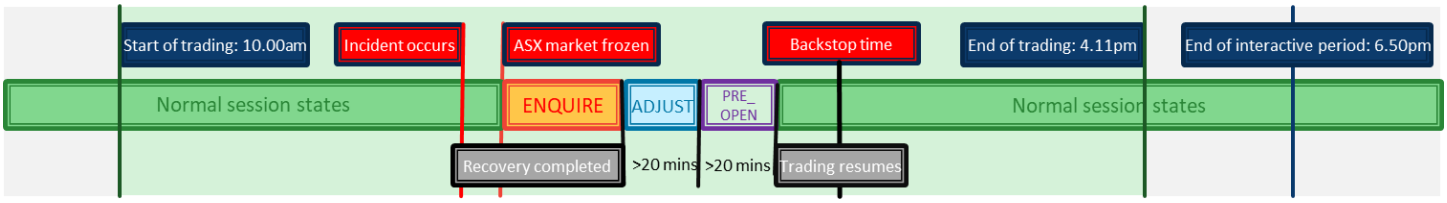
Current Scenarios

As discussed in Consultation 1, an incident in ASX Trade will currently play out under one of three scenarios dependent on the timing of the incident, the timing of recovery and restart and the backstop time for assessing whether the market will resume. These are set out in the table below.

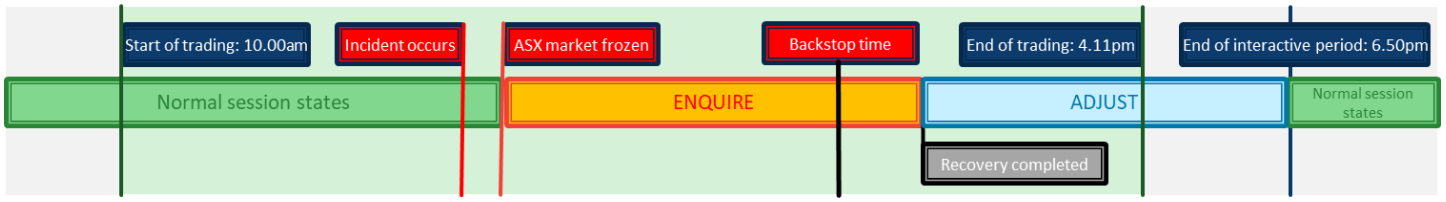
Market resumption	System recovery	
	Possible before end of interactive period – 6:50pm	Not possible before end of interactive period – 6:50pm
Incidents occurring before the cut-off time – 1:30pm		
Possible before cut-off time: 1:30pm	Scenario 1	Not possible System recovery must occur before market resumption
Not possible before cut-off time -1:30pm	Scenario 2	Scenario 3
Incidents occurring after the cut-off time – 1:30pm		
Not possible	Scenario 3	Not possible System recovery must occur before market resumption

The diagrams below illustrates the three playbook scenarios. The illustrations assume the incident happens after market open. However, the playbooks will be identical if the incident occurs before market open.

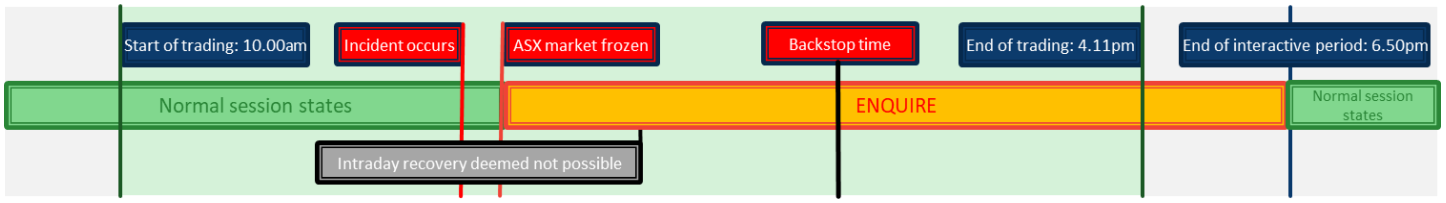
Scenario 1: Recovery and market resumption before the backstop time



Scenario 2: No market resumption; recovery after the backstop time



Scenario 3: No market resumption; no intraday recovery



This scenario occurred in both the September 2016 and November 2020 incidents.

Annexure A – Consultation 2 Questions

2. Order Download Service

ASX proposes to develop a new, more secure and robust order download service (ODS) for use during incidents, to improve certainty over Participant order book positions.

Question 2.1: Are you supportive of this proposal?

Question 2.2: If so, how could you make use of the service?

Question 2.3: Please provide any further feedback you have regarding this proposal?

Question 2.4: In considering data security - would there be any challenges if private data fields (exClient Info, Customer Info and Regulatory data) was omitted from the file?

3. Trade Download Service

ASX proposes to develop a new, more secure and robust trade download service (TDS) for use during incidents, to improve certainty over executed trades.

Question 3.1: Are you supportive of this proposal?

Question 3.2: If so, how could you make use of the service?

Question 3.3: Please provide any further feedback you have regarding this proposal?

4. CANCEL_ONLY Session State

ASX proposes to develop and configure a new cancel only session state for use during incidents. This will allow the cancellation of working orders without relying on normal broadcast responses which may have been corrupted. In this scenario, certain system broadcasts may be disabled where there is no certainty they are functioning correctly.

Question 4.1: Are you supportive of this proposal?

Question 4.2: If so, how would you make use of the service?

Question 4.3: Please provide any other feedback you have regarding this proposal including the level of change required for you to support and make use of this session state?

5. Intraday Restart

ASX proposes to explore developing and testing the ability to restart ASX Trade within a trading day and resume the market following an incident.

Question 5.1: Are you supportive of this proposal?

Question 5.2: Do you believe an intraday restart would be of benefit to the market?

Question 5.3: Describe any system impact(s) you foresee and the effort required for you to support an intraday restart of ASX Trade?

Question 5.4: Please provide any further feedback you have including any estimated timeframes it would take were ASX Trade restarted intraday for you to be 'back online' and ready to trade?

6. General

Question 6: Are there any additional issues, concerns or ideas relating to the proposals raised in this consultation that might be considered by ASX?

Annexure B – ASIC REP 708 | Summary of expectations for Market Operators

E1: Monitoring market data issues

- Market operators should develop automated systems and processes to proactively monitor for market data issues within their trading systems and identify trading anomalies in real time.

E2 (i): Session state procedures

- Market operators need to refine their procedures for session states during market outages. This includes clear thresholds for moving to a session state that accommodates participant interaction, check points at which this will be re-assessed throughout the day, staff responsible for providing advice and decision making, and consideration of participants' order management requirements to continue trading on alternative trading venues.

E2 (ii): Alternatives to Enquire

- ASX should explore alternatives to the Enquire session state for mitigating risks to its trading system and market data from order amendments during market outages, and assess options that allow participants to manage their orders. This may involve purging some (i.e. good-for-day) or all orders submitted on the day after a specified checkpoint time, or developing additional session states, and will require further consultation with participants.

E3: Procedures for confirming trade and order status

- Market operators need to refine their policies and processes for providing participants with trade confirmations and order status. This includes the development of playbooks with a hierarchy of alternative systems and data formats for providing information to participants so they can continue trading on alternative trading venues in an informed manner. Further consultation with participants on technical requirements is likely to be required.

- Market operators must inform all participants of alternative arrangements in place to provide trade confirmations during operational incidents where they are not reliably available via the usual channels. Market operators need to ensure that this information is promptly available, accessible and accurate.

E4: Communication protocols

- Market operators need to review their communication protocol for market outages and consult with participants on the types of additional updates and standardised information that could help with providing greater certainty, including nature of issues, order status, order management and the process for reconciling trade positions.

- Market operators must develop and agree on communications protocols for incidents or major events (including outages) that may affect other market operators that rely on and interact with common market infrastructure. Depending on the nature of a market outage, coordination between market operators may be critical for re-establishing an orderly market.

E5: Market re-opening protocols and alternatives

- Market operators must develop a formal protocol with intraday checkpoints during an outage day and a final cut-off time after which the market would not be re-opened. This includes threshold issues that would enable the market to be re-opened, minimum required trading session length to support orderly trading, and notification time for participants to prepare for resumption of trading.

- Market operators should consider the feasibility of alternative approaches that may assist with restoring trading more quickly, such as an intraday reboot of key trading systems or purging some or all existing orders. This may require further consultation with participants to understand the risks and benefits of this approach.

E6: Functionality controls, playbooks & monitoring

- Market operators need to document the circumstances under which particular order types or market components will be disabled, as well as the notice period before these changes are made. This includes procedures for changes before market open as well as intraday.

- Market operators should develop robust arrangements for order monitoring and management, where order types that cannot be disabled create the risk of significant operational issues or market integrity concerns, to complement our expectations for market monitoring outlined in Expectation E1.

E7: Test approach

- Market operators need to have a comprehensive test strategy that includes a wide coverage of the system (functional, non-functional and operational aspects) and data.

- Regression testing should be conducted across the entire suite of test scenarios to demonstrate that any changes will not introduce defects.

- Market operators should conduct simulation testing with participants and other market operators to simulate scenarios with their usual order book activities ahead of major equity market system changes.

E8: BCP testing

- Market operators should facilitate testing of simulated market outage events during their business continuity plan testing that enable participants to develop test cases to participate in these scenarios.

- Recovery strategies or alternative arrangements for identified critical dependencies should be exercised (or, where appropriate, tested) as part of or in addition to standard business continuity plan exercises and tests.

Annexure C – Glossary

ADJUST	The ADJUST session state on ASX Trade as described in the ASX Operating Rules
ASIC	The Australian Securities and Investments Commission
ASIC's expectations	ASIC's expectations of Market Operators as set out in REP 708
ASX	ASX Limited
ASX market	The markets in ASX-listed products offered by ASX as a licensed Market Operator
ASX Participant	An entity authorised to interact transactionally with, and receive private data from, ASX Trade
ASX subscriber	An entity authorised to receive market data from ASX Trade
ASX Trade	The trading platform through which ASX operates the ASX market
CoD	Cancel on disconnect capability offered by ASX Trade
Corporations Act	Corporations Act 2001 (Cth)
ENQUIRE	The ENQUIRE session state on ASX Trade as described in the ASX Operating Rules
FOT	"Fair, orderly and transparent" as required of Market Operators by the Corporations Act
FOT review	A review of trades undertaken in the context of ASX's obligation to operate a FOT market
ITCH	A protocol used by ASX Trade to publish market data
long order	An order with a duration beyond the end of the current business day
market data	Data broadcast by ASX Trade to ASX subscribers that includes public non-confidential data about orders and trades
Market Operator	As defined in the MIRs
MIRs	ASIC Market Integrity Rules (Securities Markets) 2017
NBBO	The National Best Bid and Offer constructed in accordance with the MIRs
November 2020 incident	The market outage and other operational incidents that affected the ASX market in the week of 16 November 2020
OMNet	A protocol used by ASX Participants to interact with ASX Trade and by ASX Trade to publish market data and private data
other market	A market in ASX-listed securities operated by a Market Operator other than ASX
OUCH	A protocol used by ASX Participants to interact with ASX Trade and by ASX Trade to publish private data
private data	Data published by ASX Trade directly to ASX Participants to whom the data relates that contains confidential data about orders and trades

REP 708	Report 708, entitled "ASIC's expectation for industry in responding to a market outage" published by ASIC on 24 November 2021
September 2016 incident	The market outage and other operational incidents that affected the ASX market on 19 September 2016
SSP	The System Status Page on ASX's website
systematic messaging	Private data and market data variously distributed via OUCH, ITCH and OMNet
the market	The totality of all markets in ASX-listed securities operated by all Market Operators

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