



Response to ASX Market Management Consultation 3: ASX Testing Uplift, Environments and BCP

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1. Introduction

1.1 Background

ASX issued a consultation paper, 'Market Management Consultation 3: ASX testing Uplift, Environments and BCP'¹ (**the Consultation**) on 28 February 2023.

The Consultation was the last of three ASX consultations in response to the Australian Securities and Investments Commission's (ASIC's) Report 708 entitled 'ASIC's expectation for industry in responding to a market outage' (**REP 708**)². The broader context and detail of ASX's three stage consultation process in response to REP 708 are set out in the introduction of the Consultation.

This Consultation sought feedback from customers on:

1. Simulation testing with Market Participants.
2. Industry Wide Testing (**IWT**).
3. Market Operator Interconnectedness.
4. Improvements to Business Continuity Plan (**BCP**) Test Strategy.
5. Customer Test Environments.

This paper summarises the responses received to the Consultation and confirms ASX's approach in response.

1.2 Stakeholder engagement

ASX undertook a comprehensive program of stakeholder engagement in relation to the Consultation.

This engagement provided ASX with the opportunity to describe the uplift and proposed changes to the testing strategy. The stakeholder engagement also presented the opportunity to hear from customers regarding their approach to testing and the challenges they face.

Stakeholder engagement included:

- ASX Participants
- industry bodies
- vendors
- Cboe Australia³

1.3 Consultation feedback

ASX received 14 written responses from a broad range of stakeholders including Participants (9), industry bodies (2), vendors (2), and a market operator (1). ASX would like to thank the many stakeholders that participated in meetings and all the respondents that have provided written feedback. ASX would also like to acknowledge and thank AFMA⁴ and SIAA⁵ for their efforts in facilitating discussions with, coordinating responses from, and representing the views of their respective members.

¹ <https://www2.asx.com.au/content/dam/asx/about/regulations/public-consultations/2023/market-management-consultation-3-asx-testing-uplift-environments-and-bcp.pdf>

² <https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-708-asic-s-expectations-for-industry-in-responding-to-a-market-outage/>

³ Cboe Australia is the only relevant Market Operator as it is the only other Market Operator that offers ASX-listed securities.

⁴ [The Australian Financial Markets Association](#)

⁵ [Stockbrokers and Investment Advisers Association](#)

1.4 Executive Summary

The main purpose of the Consultation was to seek feedback from stakeholders around proposals to:

- increase the array of prescribed scenarios simulated during BCP and IWT test days including (but not limited to) an ALC Customer network failure and an opportunity to test the new CANCEL_ONLY session state functionality;
- encourage greater stakeholder participation in IWT and BCP events including the simulation of a more 'production-like' transactional flow;
- increase the number of BCP events conducted per year from one to two; and
- require Participants to attest to their BCP participation (previously only an IWT requirement).

ASX also sought feedback on:

- the benefits of AMO participation in BCP / IWT test events;
- requirements for customer test environments; and
- performance testing.

During customer meetings and also in written responses ASX gained a lot of valuable feedback around the key topics. Whilst customers were generally supportive of most proposals, they highlighted a number of risks and challenges in participating, logging in production systems and generating 'production-like' transactional flow during BCP and IWT testing. There was a strong theme of customers requiring ASX to contribute to the generation of transactional flow to assist with any simulation testing. There were also concerns around increasing the number of BCP test activities in addition to whether participation in the BCP would be mandatory. In respect of AMO participation, there was a consensus that AMOs should collaborate on and attend all BCP and IWT test weekends for a complete experience where customers can test their BCP arrangements and integration with all AMOs during IWT. There was informative feedback around the customer test environments including some suggested improvements.

The high level actions ASX plans to undertake following a review of all feedback are:

- Increase the number of BCP events to two per year.
- Incorporate new scenarios into BCP testing including an ALC Customer Network failure and CANCEL_ONLY session state functionality.
- Develop an improved capability to simulate 'production-like' transaction profiles during BCP and IWT events.
- Communicate more prescriptive test plans for BCP and IWT events including expectations on customers.
- Continue to collaborate with AMOs on industry testing including scenarios and alignment of dates to minimise risks and impacts on costs and resourcing.
- Investigate simulating large trading days in the Customer Development Environments (CDE).
- Extend hours of availability for Exchange Traded Options in the CDE.
- Investigate provisioning of a Signal B feed in the CDE (currently available in CDE+ only).

1.5 Format of the consultation response

The structure of this paper reflects the three main areas being consulted on:

- Section 2: IWT
- Section 3: BCP Testing
- Section 4: Customer Test Environments

The simulation and Market Operator interconnectedness themes apply across these three main areas and are therefore not summarised in separate sections.

The first part of each section is a brief introduction to the topic. Subsections set out the proposals, a summary of the customer feedback and the ASX response.

In some cases, ASX will propose amendments to existing processes or policies based on the feedback received.

ASX's policy amendments are set out in green boxes below.

2. IWT

2.1 Background

IWT events are generally held on weekends in the lead-up to the go-live of major platform changes that introduce new infrastructure or functionality requiring attestation from the industry on readiness. ASX views customer participation in these events as critical to demonstrate stakeholder readiness and to minimise any implementation risk. The number and scope of IWT test events and the expectations of customers will vary in relation to the nature, scale and complexity of the change.

ASIC REP 708 Expectation 7 states that:

“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.”

In the Consultation ASX proposed that:

- the activities that stakeholders would be expected to perform would be more prescriptive;
- Participants should endeavour to generate activity which is as close as possible to their usual production order profile;
- all market stakeholders that would normally connect to production should participate;
- stakeholders should provide an attestation that they have completed all expected activities as defined by ASX so as to allow ASX to determine the scope and results of all reviews and testing performed during the IWT; and
- any additional testing by stakeholders is welcomed and encouraged where applicable for their application and business workflows.

2.2 General Feedback

Whilst a majority of respondents supported a more prescriptive IWT in principle, there was a widespread view that customers would require ASX to extend order book activity and provide a production-like order and trade profile to assist with the simulation of realistic public market data for a subset of symbols.

The majority of respondents noted challenges in generating order activity that represents their typical production flow due to factors including (but not limited to):

- the absence of any real client orders;
- no connection to client facing systems;
- not able to deploy production systems during test weekend events;
- variances in latency profiles during testing;
- difficulty in replicating algorithm behavior during testing;
- a reliance on vendors for market data; and
- a reliance on vendors for order entry.

All customers reiterated the importance of clear communication around scheduling of IWT weekends in order to adequately plan and resource for these events within existing local and global workloads.

Customers were unanimous that AMOs' collaboration and participation during these events is important.

2.3 ASX Response

ASX will develop the capability to simulate a 'production-like' transaction profile during IWT events to generate public market data for customers to interact with for their individual validation and testing use cases for a subset of symbols.

ASX will be more prescriptive with regard to expected participant activities during IWT events. When IWT events are announced, ASX will detail expectations around attendance, expectations on customers and attestation. In most cases, customers will be required to enter transactions that are representative of their normal production behaviour.

3. BCP Testing

3.1 Background

On 10 March 2023, ASIC introduced new market integrity rules⁶ aimed at promoting the technological and operational resilience of securities and futures market operators and participants. The additional rules highlight ASIC's expectations around BCP and specifically that both Market Operators and Participants maintain plans that will effectively enable continued operation or restoration of critical business services during a major event.

External customer BCP testing for ASX Trade has historically been conducted once per year during a Saturday. The intention of BCP test days is for ASX and customers to test and improve their capability to recover from various failure scenarios. ASX views the participation of all Trading Participants, Vendors and AMOs as essential to conducting effective BCP testing. This not only allows for testing to a greater degree of accuracy but also provides stakeholders with an opportunity to provide valuable feedback that can then feed into the testing plan and process.

ASX also provides different failure scenarios during BCP events as it believes it is important to ensure all stakeholders are prepared for and aware of the potential outcomes from those scenarios. To allow for additional scenarios to be added in the future, including outages, ASX proposed increasing the number of BCP events.

BCP testing enables participants to achieve the following:

- Identify any gaps in the existing BCP, develop ways to address them and take corrective actions to increase the plan's maturity.
- Identify interdependencies to develop a coordinated plan with AMOs, in the event of a major market event.
- Speeds up response to a market crisis and ensure compliance requirements are met.
- Mitigates reputational risk to showcase resilience during times of market crisis.
- Ensure that participants' BCP is current and updated. It also enables participants to take actionable findings from the BCP testing to identify where improvements are needed.

ASIC REP 708 Expectation 8 states that:

"Market operators should facilitate testing of simulated market outage events during business continuity plan testing to enable participants to develop test cases to practice recovery strategies or switching to alternative arrangements for critical dependencies".

"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."

In the Consultation ASX proposed to:

- increase the number of ASX BCP test days per year to two;
- simulate an outage scenario that incorporates transitioning to the CANCEL_ONLY session state;
- make the new Trade and Order Download Services available for participant playbook verification;

⁶ <https://asic.gov.au/regulatory-resources/markets/market-integrity-rules/>

- incorporate a site-based failover into ASX BCP testing;
- require customers to attest to their BCP testing activities so as to allow ASX to determine the scope and results of all testing performed during the BCP; and
- require customers to simulate order flow representative of their typical production activities.

3.2 General Feedback

Respondents were open to ASX broadening the scope of BCP weekends in order to adequately cover a range of stress tests, network resiliency and performance scenarios.

A number of the challenges that were raised with regard to IWT were also raised in responses and during discussions around BCP testing. A significant number of respondents noted a range of challenges with the proposed BCP approach, including (but not limited to):

- risk to production systems being ready for next days' trading;
- competing resourcing priorities within larger organisations;
- critical releases and the type of engagement;
- commitment required might not be possible due to staffing;
- internal technology challenges on often global systems; and
- resourcing cost challenges.

Some respondents were concerned BCPs would be mandated, with two stating that BCP test participation and any associated attestation should be optional. The general sentiment was that if there were more than one BCP weekend scheduled, only one should be designated as mandatory.

Respondents repeated the challenges generating order activity which is representative of their typical production flow due to factors including (but not limited to):

- the absence of any real client orders;
- no connection to client facing systems;
- not able to deploy production systems during test weekend events;
- variances in latency profiles during testing;
- difficulty in replicating algorithm behavior during testing;
- a reliance on vendors for market data; and
- a reliance on vendors for order entry.

All respondents agreed that AMOs should collaborate on and attend all aspects of BCP weekends for a complete experience where customers can test their BCP arrangements with all AMOs.

In addition, AMOs aligning their dates allows participants to minimise the risk and impact on costs and resourcing.

The majority of customers requested that ASX generate and provide a production-like order and trade profile to assist with the simulation of realistic public market data for a subset of symbols.

Customers were broadly supportive to test site-based fail overs.

3.3 ASX Response

Following a review of all feedback, ASX understands the industry challenges and effort required to conduct successful BCP events. ASX still believes however that there are great benefits for all stakeholders by incorporating more simulated failure scenarios across two annual BCP events.

ASX will develop a capability to simulate a 'production-like' transaction profile during BCP events to generate public market data for customers to interact with for their individual validation and testing use cases for a subset of symbols.

The proposed network failures and any new functionality, such as CANCEL_ONLY session state events and other scenarios, will be covered across the two BCP events.

ASX will request and expects that all Participants attend the two scheduled BCP events each year. ASX may also look to include this in the operating rules depending on the level of attendance and participation observed. Vendors and AMOs will also be strongly encouraged to participate in all BCP events.

To satisfy MIR obligations, ASX BCP events will require participants to complete a 'Declaration Confirming Scope of Participation' so as to allow ASX to determine the scope and results of all testing performed during the BCP.

ASX will endeavour to consult with other AMOs to align and agree to BCP dates.

ASX will collaborate with other AMOs and agree on scenarios that will be tested.

ASX will collaborate with other AMOs and agree on timelines for the BCP event and jointly communicate with stakeholders.

ASX will continue to review and refine the BCP plan to ensure it is kept relevant, up to date and includes appropriate scenarios.

4. Customer Test Environments

4.1 Background

ASX offers two Customer Development Environments, 'CDE' and 'CDE+', that are available to Participants seven days a week. CDE runs the current production version. CDE+ runs either the current production version or the upcoming future release when one is available for test. Both environments offer connectivity for OMNet, ITCH and OUCH protocols and incorporate a full set of current production instruments. As well as being available on weekends, some CDE markets also run non-standard trading schedules to allow for extended trading hours and a larger number of state transitions.

These environments are not a direct replica of the production environment in terms of the number of servers and gateways. However, Participants may see similar performance to production. ASX has scaled the CDE environments to be able to support production-like message capacity across all protocols.

ASX's view on latency testing is that it is largely irrelevant without an active market, as the market activity, volatility, and message bursts impact latency. Performing an isolated test with no live market and the associated activity will yield no meaningful results.

ASX consulted with customers to:

- gain feedback on the CDE environments, any pain points or suggested enhancements;
- determine what aspects of performance testing were important to customers and whether these can be satisfied by the current CDE environments; and
- determine the physical location of customers' test environments compared to their production systems to determine whether a dedicated production replica performance environment would be a viable option for comparison.

4.2 General Feedback

The general sentiment was that customers were happy with the current CDE environments.

There were common themes and suggestions for improvements which included (but are not limited to):

- customer testing trading infrastructure are not scaled to the same level as their production environment, and testing is largely focused on functional testing;
- most customers were unaware that CDE environments were scaled to production messaging capacity;
- customers generally advised that whilst CDE environments had scale capability, they would find it difficult to generate production-like load and would require ASX to generate a load profile;
- message count capacity testing is more important than latency testing;
- performance testing had varied meanings - generally, customers' views were that performance testing was viewed as message capacity and public market data rates of messages;
- addition of ASX Signal B feed to CDE (currently only available in CDE+);
- non-standard schedules applied for Options and Tailor Made Combinations to accommodate test resources located outside of the Australian time zone (similar to what is applied for Equities);
- customers would like ASX to run a background production-like load to generate public market data, including auctions activity to aid with testing, including stress testing;
- reserve instruments for exclusive use for a Trading Participant by request;

- more scheduled state transitions for session states such as REG_HALT and CANCEL_ONLY; and
- a customer 'self-service' portal to request:
 - User Accounts;
 - Password resets;
 - Session State Changes; and
 - Corporate Actions.

4.3 ASX Response

ASX will develop a capability to simulate a 'production-like' transaction profile to generate public market data for customers to interact with for their individual validation and testing use cases for a subset of symbols.

ASX will investigate simulating a "large trade day" to support customer performance and capacity testing.

ASX CDE environments cater to what is important to customer testing in regard to capacity.

ASX will not build a full production replica environment for customer latency testing. However, the current CDE environments are scaled for production capacity.

ASX notes only one customer conducted any level of "latency testing" during the ASX Trade refresh program IWTs leading up to go-live.

ASX to further extend trading hours in the CDE environments for Options and Tailor Made Combinations.

ASX to investigate offering customers dedicated tradable instruments for testing purposes in the CDE environments.

ASX will investigate Signal B feed in the CDE Environment. Note: this is currently available in the CDE+ Environment.

ASX will update CDE documentation to reflect any enhancements.

5. Next Steps

- ASX will begin conducting two BCP events per year in coordination with Cboe. The next BCP event is scheduled for 3rd June 2023. The next event following that is pencilled in for 14th October 2023. ASX will include a customer network isolation scenario for this event.
- The CANCEL_ONLY session state functionality will be introduced in the CDE+ environment in July 2023. This will enable customers to develop and test with the new session state. An IWT event that incorporates both the new CANCEL_ONLY session state plus the Order (ODS) and Trade (TDS) SFTP download services will be conducted in the production environment in Q1 2024.
- ASX will begin development work for production simulation capabilities to assist customers with their testing. These capabilities will be incorporated into future BCP events, IWT events and also in the Customer Development Environments (CDE and CDE+).
- ASX will modify schedules to extend hours of availability for Exchange Trade Options (ETO) in the CDE environments and update documentation in June 2023.

Annexure A – Glossary

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
BCP	Business Continuity Planning
BCP Testing	A Business Continuity Plan Test ensures a firm’s incident management, disaster recovery and overall BCP are fit for purpose and can be prepared to respond in the event of critical operational failure or incident. A BCP test scenario is based on simulating a particular type of incident using backup sites and recovery facilities.
Corporations Act	Corporations Act 2001 (Cth)
ITCH	A protocol used by ASX Trade to publish market data
IWT	Industry Wide Testing that is focused on transitioning one or more new systems, products, or processes into normal BAU operation.
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
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
the market	The totality of all markets in ASX-listed securities operated by all Market operators

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 – ASIC REP 708 | Action Plan for Expectations 1-8

ASIC Expectation	ASX Update – May 2023	Target Completion Date
Expectation 1: Improve monitoring tools and proactively find issues	<ul style="list-style-type: none"> Crossed Book monitoring tools (ITCH, OMNet) – in Beta testing Production Replay Tool – Core Development Completed 	<ul style="list-style-type: none"> Sept 2023 (Go-Live) Impact to ASX only
Expectation 2.1: Session State Protocols Expectation 2.2: Session State Alternatives	<ul style="list-style-type: none"> ASX is currently testing the CANCEL_ONLY session state configuration on ASX Trade, in readiness to deploy into the Customer Development Environment (CDE+) 	<ul style="list-style-type: none"> July 2023 (CDE+) Mar 2024 (Go-Live post IWT)
Expectation 3: Confirmation Protocols – Trades and Orders	<ul style="list-style-type: none"> ODS & TDS file output in Beta Testing ASX is completing its development of the SFTP solution for the ODS_TDS service (including back-up solution) 	<ul style="list-style-type: none"> Mar 2024 (Go-Live post IWT)
Expectation 4: Communication Protocols	<ul style="list-style-type: none"> ASX has implemented the Incident Communication Templates covering disruptions to trading platform 	<ul style="list-style-type: none"> Delivered
Expectation 5.1: Market re-opening protocols Intraday checkpoints and cut-off times Expectation 5.2: Recovery Alternatives – Intra-day Restart	<ul style="list-style-type: none"> ASX has implemented it's Market Closure Assessment and updated operational procedures. Quarterly fire drills are conducted Refer to Market Management Consultation 2 response publication 	<ul style="list-style-type: none"> Delivered Descoped
Expectation 6: Functionality – Document Controls	<ul style="list-style-type: none"> Disabling order types and functionality – under internal operational testing 	<ul style="list-style-type: none"> Sept 2023
Expectation 7: Software Release Testing Framework	<ul style="list-style-type: none"> ASX has completed a comprehensive test strategy for the ASX Trade Platform including Quality Engineering Testing (QET) recommendations to date Progressing the development of the enhanced ASX Trade Test Automation Framework 	<ul style="list-style-type: none"> Delivered Oct 2023
Expectation 8: Business Continuity Planning and IT Disaster Recovery	<ul style="list-style-type: none"> Market Consultation 3 completed BCP and IWT Uplifts to be planned following ASX response publication 	<ul style="list-style-type: none"> Q1 2024