

ASX Trade Guide to Testing Services

Version 1.0 | March 2018

INFORMATION CLASSIFICATION - CONFIDENTIAL



Table of Contents

1. Introduction	3
1.1. Readership	3
1.2. Contacts	3
1.3 Document History	3
2. Service Overview	4
3. ASX Trade Open Interface.....	4
3.1. Service Description	4
3.2. Access to the Open Interface	5
Trading Day Cycle	5
3.2.1. PTE Availability.....	5
3.2.2. Standard Schedule.....	5
3.2.3. Exceptional Schedule.....	7
3.3. Load Injector	11
3.4. Performance Testing.....	11
3.5. BN1 Generator.....	11
3.6. ITCH Packet Drop.....	11
4. ASX Trade ITCH and OUCH.....	11
5. Practice Market.....	12
6. Conformance Testing.....	13

1. Introduction

The ASX provides a range of testing services to customers developing and testing market-facing systems.

The purpose of this document is to provide an overview of the ASX customer testing services available and how to access them.

When read in conjunction with ASX technical specifications and connectivity guides, it is intended that these documents provide all of the necessary information customers require to develop, test and trial their software before connecting to ASX Trade production services.

Please note that all times quoted are in Sydney time (AEST/AEDT).

1.1. Readership

This document is relevant to software developers, system testers, and other technical staff who are involved in testing and developing applications for the ASX Trade system.

1.2. Contacts

The Customer Technical Support (CTS) team operates a 'service desk' style support centre for ASX customers, which provides support coverage on ASX trading days, 07:00 to 18:00. After-hours support and escalation is provided via the ASX Trading Operations team.

Questions about test environments can be directed to CTS:

Email: CTS@asx.com.au

Phone: From within Australia 1800 663 053

From outside Australia +612 9227 0372

1.3 Document History

Issue	Date	Description
1.0	1 March 2018	Draft version published for internal review



2. Service Overview

The test environments are for customers to test the functional interface between their software applications and the ASX Trade system. Customers can perform the following:

- Development of new software applications and/or features
- Conformance of their software applications for use on the production service
- Provide market participants with a safe training environment away from the production service
- Verify that their market data applications can successfully process messages
- Test their application's ability to recover from service disruptions
- Test outside of normal market hours

The above service offerings are available via a combination of testing environments described in the following sections.

The ASX Trade test system is called the Participant Test Environment (PTE). Within the PTE, the test markets offered for the ASX Trade platform are the FTE and ETE, described in section 3 below.

Both the FTE and ETE support the Open Interface (OI), ITCH and OUCH services. Connectivity details for these services can be obtained by contacting CTS.

3. ASX Trade Open Interface

3.1. Service Description

The PTE's Open Interface provides a shared test environment for all participants to help them develop, test and run their trading and market data applications for the ASX Trade on two separate test markets, FTE and ETE.

The FTE environment utilises the most current version of ASX Trade software and the ETE has the next version of the software. Both the FTE and ETE are only for functional testing, they are not built for capacity or load testing. There is no end-to-end integration into CHESS.

- **Functional Test Environment (FTE)**

The FTE is a communal test market that uses the current production version of the ASX Trade software.

- **Enhanced Test Environment (ETE)**

Similar to the FTE, except that ETE has the next version of the ASX Trade software, containing bug fixes and new features to be part of the next release of ASX Trade.



Within the FTE and ETE these interfaces are available: ASX Trade Open Interface (the “OI”), ASX OUCH, and ASX ITCH.

3.2. Access to the Open Interface

To access the PTE OI, customers will be required to complete an order form via their Business Development Manager (Technical Services) representative.

Connectivity can be established via the following methods:

1. Direct Connectivity from an ALC Cabinet
2. Connectivity over ASX Net
3. Connection via VPN

For more information on the connectivity methods, please contact CTS.

Trading Day Cycle

3.2.1. PTE Availability

The FTE and ETE operate 7 days a week across all instruments. In addition, equity groups 3-5 follow an exceptional schedule.

3.2.2. Standard Schedule

All times are in AEST.

Trading Session State	Description	Time
PRE_OPEN	PRE_OPEN is 07:00 - 10:00. During PRE_OPEN: <ul style="list-style-type: none">• Brokers enter orders into ASX Trade in preparation for the market opening.• Matching does not occur and prices can overlap.	07:00:00 – 10:00:00



Trading Session State	Description	Time
OPEN	<p>The opening process starts at approx. 10:00 and lasts for approx. 10 minutes. ASX Trade calculates opening prices during this phase. Securities open in five groups, according to the first letter of their ASX code:</p> <p>Group 1 10:00:00 +/- 15 secs 0-9 and A-B, e.g. ANZ, BHP Group 2 10:02:15 +/- 15 secs C-F, e.g. CPU, FXJ Group 3 10:04:30 +/- 15 secs G-M, e.g. GPT Group 4 10:06:45 +/- 15 secs N-R, e.g. QAN Group 5 10:09:00 +/- 15 secs S-Z, e.g. TLS</p> <ul style="list-style-type: none"> Each approx. time is randomly generated by ASX Trade and occurs up to 15 seconds on either side of the times given above, e.g. Group 1 will open at any time between 09:59:45 and 10:00:15 	10:00:00 +/- 15 secs
PRE_CSPA	Between 16:00 and 16:10, Sydney time, the market is placed in PRE_CSPA. Similar to PRE_OPEN, matching is prevented and brokers can enter, amend and cancel orders in preparation for CSPA.	16:00:00 – 16:10:00
CSPA	<p>The Closing Single Price Auction occurs between 16:10* - 16:12</p> <p>ASX Trade calculates closing prices during this phase.</p> <p>*Randomized +/- 30 secs</p>	16:10:00* - 16:12:00
ADJUST	The ADJUST state allows for trade reports, trade cancellation, amend of orders where priority is not improved, and cancellation of orders. No matching occurs.	16:12:00 – 16:42:00

Trading Session State	Description	Time
ADJUST_ON	This state is the same as the ADJUST session state.	16:42:00 – 18:50:00
PURGE_ORDERS	This state allows for trade cancellation and trade reporting only. Where orders meet the purge criteria, they will be cancelled.	18:50:00 – 18:59:00
SYSTEM_MAINTENANCE	Administration/system adjustment session state.	18:59:00 – 19:00:00
CLOSE	No trading messages may be entered or amended in ASX Trade and no matching or auctions take place.	19:00:00 – 19:30:00

Specific contract session timings follow the production times described here:

<http://www.asx.com.au/about/trading-hours.htm>

Use the drop-down selection box to view the schedules, the first three choices: Shares, Warrants, Options are relevant to the ASX Trade market.

3.2.3. Exceptional Schedule

To facilitate further testing of trading sessions and allow for testing out of Sydney time zone, the FTE and ETE has a modified schedule for equity instruments in groups G-M, N-R, S-Z (groups 3, 4, 5) as detailed in the following tables. These instruments cycle through the trading states more frequently than in a standard schedule.

Equity Market Group 3 (G-M)

Trading Session State	Time
PRE_OPEN	01:10:00
OPEN	01:15:00
PRE_OPEN	09:55:00
OPEN	10:04:15
PRE_CSPA	16:00:00
CSPA	16:15:00
ADJUST	16:17:00
ADJUST_ON	16:42:00
PRE_OPEN	17:10:00
OPEN	17:15:00



Trading Session State	Time
ADJUST	21:17:00
ADJUST_ON	21:18:00
PURGE_ORDERS	21:20:00
SYSTEM_MAINTENANCE	21:29:00
CLOSE	21:30:00

Equity Market Group 4 (N-R)

Trading Session State	Time
PRE_OPEN	00:10:00
OPEN	00:15:00
PRE_OPEN	09:55:00
OPEN	10:06:30
PRE_CSPA	16:00:00
CSPA	16:10:00
ADJUST	16:12:00
PRE_OPEN	16:25:00
OPEN	16:30:00
ADJUST	21:17:00
ADJUST_ON	21:18:00
PURGE_ORDERS	21:20:00
SYSTEM_MAINTENANCE	21:29:00
CLOSE	21:30:00

Equity Market Group 5 (S-Z)

Trading Session State	Time
PRE_OPEN	00:10:00
OPEN	04:00:00



Trading Session State	Time
PRE_CSPA	04:15:00
CSPA	04:30:00
PRE_OPEN	04:32:00
OPEN	06:00:00
PRE_CSPA	06:15:00
CSPA	06:30:00
PRE_OPEN	06:32:00
OPEN	10:08:45
PRE_CSPA	10:15:00
CSPA	10:30:00
PRE_OPEN	10:32:00
OPEN	12:00:00
PRE_CSPA	12:15:00
CSPA	12:30:00
PRE_OPEN	12:32:00
OPEN	14:00:00
PRE_CSPA	14:15:00
CSPA	14:30:00
PRE_OPEN	14:32:00
OPEN	15:45:00
PRE_CSPA	16:00:00
CSPA	16:15:00
ADJUST	16:17:00
PRE_OPEN	16:25:00
OPEN	16:30:00
PRE_CSPA	21:00:00

Trading Session State	Time
CSPA	21:10:00
ADJUST	21:12:00
ADJUST_ON	21:18:00
PURGE_ORDERS	21:20:00
SYSTEM_MAINTENANCE	21:29:00
CLOSE	21:30:00

3.2.4 ETE Schedule

Equity Market Group 1 (0-9 and A-B)

Same as FTE

Equity Market Group 2 (C-F)

Trading Session State	Time
PRE_OPEN	07:00:00
OPEN	10:02:00
PRE_CSPA	18:40:00
CSPA	18:42:00
ADJUST	18:44:00
ADJUST_ON	18:46:00
PURGE_ORDERS	18:50:00
SYSTEM_MAINTENANCE	18:59:00
CLOSE	19:00:00

Equity Market Group 3 (G-M)

Same as FTE

Equity Market Group 4 (N-R)

Same as FTE



Equity Market Group 5 (S-Z)

Same as FTE

3.3. Load Injector

ASX runs a load generation script in both the FTE and ETE so customers can test against valid data such as order depth and trades. Data is loaded in for viewing and testing by participants. The activity is supplied at a reduced volume and speed – a sample set of data from production is fed into FTE and ETE at a speed of 1 transaction per second (tps). Customers can use orders entered by the injector to execute against as part of their testing. Production is simulated by taking an aged log file and injecting the market data based on historical activity. As a result, activity in test market order books is closely related to its proportion of activity in the production environment. Popular equities such as BHP and CBA will display frequent activity. Options, warrants and interest rate products will display less activity.

3.4. Performance Testing

ASX sets limits on performance testing in ASX Trade. Customers should only test within expected production limits, ensuring that they do not process unrealistic volume through the environment.

OI users will be throttled to 10 or 50 tps, depending on their profile settings.

OUCH customers may test to the expected rate required in production. e.g. 100, 200, 300 tps. No throttling is applied to OUCH users.

3.5. BN1 Generator

Network broadcasts relay information on the status of the network, particularly the link between the gateway and ASX Trade. They differ from central server broadcasts as they are disseminated from the gateway, not the central server. ASX runs a BN1 message generator script to simulate situations in production where BN1 messages will be sent to OI connections. The OI application will be required to maintain a continuous connection to the test environment throughout the BN1 message process. Please refer to the broadcast manual on the [ASX Trade Document Library](#).

3.6. ITCH Packet Drop

The UDP packets will experience a 10% loss for the duration of 120 seconds. This occurs on the hour from 10:00 to 16:00, 7 days a week. As ITCH multicast and blink services both use UDP, packets are not guaranteed delivery. Whilst messages may be dropped this is not a regular occurrence. The packet drop configuration in the test environment has been created to encourage testing of the ITCH Rewinder service, allowing clients to configure their systems for recovery on the UDP channels.

4. ASX Trade ITCH and OUCH

The ITCH and OUCH services are available on both the FTE and ETE systems.



5. Practice Market

This is a special market which is offered as part of the ASX Trade **production** system. The practice market allows users to practice and train in accordance with ASX Operating Rules. This market must not be used for general testing of the OI as it has an impact on network traffic. Practice instruments should be used only for connectivity testing and training purposes.

In the practice market:

- Orders can be entered for practice
- Trades are executed without the daily totals being affected
- Orders and trades are deleted nightly
- Practice market executions do not flow through to production clearing and settlement systems

At the interface level, the practice market is defined as:

Market	Description	Internal ID
PRAC	PRACTICE MARKET	250

Instrument Type	Description	Market	Instrument Group
PACO	PRACTICE AMER CALL OPT	PRAC	ACO
PAPO	PRACTICE AMER PUT OPT	PRAC	APO
PCB	PRACTICE FIXED RATE NOTES	PRAC	FIX
PCNV	PRACTICE CONVERTIBLE NOTES	PRAC	CNV
PEBA	PRAC EQUITY BARR AMER CALL WAR	PRAC	EBA
PEBB	PRAC EQUITY BARR EURO CALL WAR	PRAC	EBB
PEBY	PRAC EQUITY BARR AMER PUT WAR	PRAC	EBY
PEBZ	PRAC EQUITY BARR EURO PUT WAR	PRAC	EBZ
PECO	PRACTICE EURO CALL OPT	PRAC	ECO
PEFC	PRACTICE LEPO	PRAC	EFC
PEPO	PRACTICE EURO PUT OPT	PRAC	EPO
PEQA	PRACTICE AMER CALL WARRANT	PRAC	EQA
PEQB	PRAC EQUITY EURO CALL WAR	PRAC	EQB
PEQT	PRACTICE EQUITY SECURITY	PRAC	EQT
PEQY	PRAC WARRANT EQUITY AMER PUT	PRAC	EQY
PEQZ	PRAC EQUITY EURO PUT WAR	PRAC	EQZ
PFAC	PRAC AMER FUTURE CALL OPTION	PRAC	FAC
PFAP	PRAC AMER FUTURE PUT OPTION	PRAC	FAP

Instrument Type	Description	Market	Instrument Group
PFRN	PRACTICE FLOATING RATE NOTES	PRAC	FRN
PFUT	PRACTICE FUTURE	PRAC	FUT
PGL	PRACTICE GOVERNMENT LOANS	PRAC	GL
PHYB	PRACTICE HYBRID SECURITIES	PRAC	HYB
PICY	PRAC INSTAL ROLL AMER CALL WAR	PRAC	ICY
PINA	PRAC INDEX AMER CALL WAR	PRAC	INA
PINB	PRAC INDEX EURO CALL WAR	PRAC	INB
PINY	PRAC INDEX AMER PUT WAR	PRAC	INY
PINZ	PRAC INDEX EURO PUT WAR	PRAC	INZ
PISA	PRAC INSTAL AMER CALL WAR	PRAC	ISA
PISB	PRAC INSTAL EURO CALL WAR	PRAC	ISB
PIXA	PRAC INDEX AVISTA WAR	PRAC	IXA
PSIA	PRAC SLF/FD INSTAL AMER CALL WAR	PRAC	SIA
PWHL	PRAC WHOLSALE INT RATE SECURITIE	PRAC	WHL
PDTM	PRACTICE GENERIC TAILOR MADE	PRAC	TMC

6. Conformance Testing

The conformance testing process is designed to test and certify application functionality based on a customer's intent for the application. It aims to ensure that applications:

- Can communicate with the production system in the correct manner
- Do not adversely affect the production system
- Do not inadvertently affect the production market.

Each customer application must pass the conformance test prior to their application going live in production. Customers using a vendor-supplied system will rely on the vendor company to seek accreditation for their own systems.

For details relating to conformance testing, please contact CTS and your Technical Account Manager.

Disclaimer

This document provides general information only and may be subject to change at any time without notice. ASX Limited (ABN 98 008 624 691) and its related bodies corporate ("ASX") makes no representation or warranty with respect to the accuracy, reliability or completeness of this information. To the extent permitted by law, ASX and its employees, officers and contractors shall not be liable for any loss or damage arising in any way, including by way of negligence, from or in connection with any information provided or omitted, or from anyone acting or refraining to act in reliance on this information. The information in this document is not a substitute for any relevant operating rules, and in the event of any inconsistency between this document and the operating rules, the operating rules prevail to the extent of the inconsistency.

ASX Trade Marks

The trademarks listed below are trademarks of ASX. Where a mark is indicated as registered it is registered in Australia and may also be registered in other countries. Nothing contained in this document should be construed as being any licence or right to use of any trade mark contained within the document.

ASX

