



CHESSE Replacement Industry Test Strategy

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1. Introduction to the Industry Test Strategy

1.1. Source

The ASX Industry Test Strategy is issued and maintained by ASX Limited (ASX).

1.2. Purpose of Industry Test Strategy

The purpose of the Industry Test Strategy is to inform software providers and CHES users on the approach to the different industry test stages and the associated industry test environments (ITEs), and to provide guidance on the requirements for the successful go-live of the CHES replacement solution. This document provides an overview of each test stage, where software providers and CHES users are provided with the environment and tools to test the new CHES platform. Industry testing will occur primarily across two environments, Industry Test Environment 1 (ITE1) and Industry Test Environment 2 (ITE2). Optionally software providers and CHES users can functionally test migrated data in Industry Test Environment Migration (ITE-M). Cutover rehearsals will be run in the 'to be' production environment, however details associated with cutover and migration will be covered as part of a separate strategy.

The Industry Test Strategy provides:

- an overview and timeline of industry testing;
- approach to industry testing for both software providers and CHES users;
- an overview of the industry test environments; and
- the release plan for other supporting industry testing documentation.

The approach to migration and cutover will be documented separately and is targeted to be published as per the release plan in Section 6.

2. Industry Testing Overview and Timeline

2.1. Project Overview

CHESS is the core system that performs the processes of clearing, settlement, asset registration, and other post trade services which are critical to the orderly functioning of the market. ASX is replacing CHESS with a distributed ledger technology (DLT) solution which will provide a broader range of benefits to a wider cross section of the market. While ASX works on the implementation of DLT, it will continue to support and invest in maintaining the high performance and availability of current CHESS.

The CHESS replacement system will continue to cater to a diverse group of stakeholders consisting of clearing and settlement participants, product issuer settlement participants (PISPs), approved market operators (AMOs), payment providers, issuers and their share registries. The project will modernise and upgrade critical market infrastructure and enable processes to be digitised, increase efficiency and capacity, reduce risk, deliver new functionality, lower barriers to entry for service providers, and stimulate product development and innovation. The new solution allows authorised customer access to source of truth data, has compatibility with ISO 20022 XML and FIX message-based paradigms and will also include browser-based access. Furthermore, access channels are non-mutually exclusive (with the exception of AMO access which must be via FIX). All the access channels will have strong authentication, authorisation and privacy security controls enabled.

For further information including the Operational Procedure & Guidelines and Functional Specifications (including changes), please refer to [Technical Documentation](#).

2.2. Overview of Industry Testing Stages

Since the commencement of the development phase of the CHESS replacement project, software providers (i.e. vendors and those developing in-house systems) have access to Customer Development Environments (CDEs). The purpose of CDE was to provide a functional-only test bed for each software provider so that they could develop and test in an independent and dedicated environment. This allowed software providers to gain early access to the software and to progressively develop alongside ASX. In doing so, ASX was able to receive feedback from those developing and incorporate changes in an incremental and iterative model. As the solution has matured and following the delivery of the full functional payload, ASX will be moving towards industry testing.

Industry testing comprises of two key stages: software provider readiness and CHESS user readiness. Software provider readiness is a stage where software providers are required to perform functional and non-functional testing, allowing them to finalise development. CHESS user readiness is a stage for CHESS users, allowing them to test their systems in preparation for operational readiness. Each stage of testing will occur in dedicated Industry Test Environments (ITEs). Software provider readiness testing will primarily be performed in Industry Test Environment 1 (ITE1) and CHESS user readiness testing will primarily be performed in Industry Test Environment 2 (ITE2).

However a separate phase of testing, **inflight migration testing**, will take place in a separate, dedicated environment, Industry Test Environment Migration (ITE-M). Inflight migration testing is optional and provides software providers and CHESS users the opportunity to test their applications' functionality based on data which has been migrated from current CHESS, prior to the scheduled market dress rehearsal (MDR) weekends.

There are two distinct phases for software providers in ITE1:

- **System testing (including performance testing)** which provides software providers a phase to complete their functional and non-functional development and undertake testing; and
- **Technical accreditation**, where software providers will need to demonstrate their software's ability to connect and interact with CHESS replacement system.

3. Software Provider Readiness

3.1. Overview of Software Provider Readiness Testing

Software providers refer to either third party vendors who supply software to CHES users or to those who develop software in-house.

Third party vendors develop software for a range of CHES users that provide:

- an interface solution between CHES replacement system and a CHES users' own internal system(s); or
- a full back office solution, supporting both workflow processing and interfaces to the CHES replacement system.

Organisations that develop software in-house develop software to meet their own business needs.

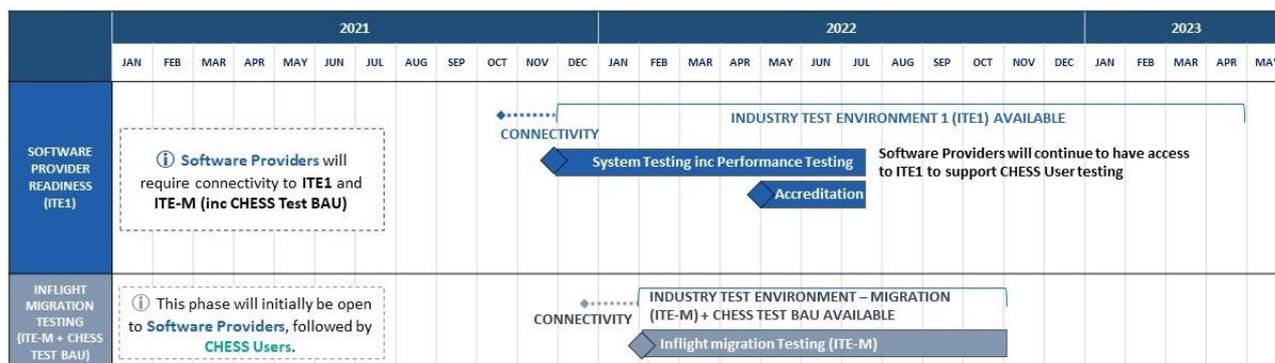
Software provider readiness testing can be categorised into three key phases:

- System Testing including Performance Testing (ITE1);
- Inflight Migration Testing (ITE-M); and
- Technical Accreditation (ITE1).

Details on the forward plan for supporting documentation are provided in Section 6.2.

3.2. Phases of Software Provider Readiness Testing

This section describes a number of test phases for software provider readiness, where the exit criteria is to pass technical accreditation.



3.2.1 System Testing

Software providers should have completed all functional development available in CDE prior to the opening of ITE1, however there are a small number of additional functional features which will be available for testing in ITE1.

There are also a number of non-functional requirements that software providers would have developed but not had an opportunity to test. This includes:

- AMQP - new optional reporting queue. This new feature allows a response to report requests to be routed through a new message queue;
- Ledger API - token acquisition. This is a new security feature that requires software providers developing to the Ledger API to build a token acquisition feature; and
- Performance and simulated network outage testing - software provider will want to test how their applications operate under workload and in the event of a network outage.

The ISO 20022 message signing feature which was optional in CDE will be mandatory in all ITE environments.

Each software provider will system test their software in ITE1 prior to deploying software to their clients in ITE2 to establish that their software product meets expectations and is defect free.

ITE1 will open with all functional and non-functional components of the CHES replacement system:

Functional

- account management;
- market events (corporate actions);
- transfers and conversions;
- trade registration;
- batch back-out;
- batch settlement;
- collateral management;
- mFund; and
- reporting.

Non-functional

- performance; and
- simulated network outage testing.

In addition to the above, software providers are encouraged to review and test the ASX published operational readiness scenarios, as applicable, in preparation for support of their CHES users.

Further details regarding operational readiness will be published at a later date in the Operational Readiness User Guide as per the Documentation Release Plan.

ASX will periodically schedule component failures to allow software providers to test how their applications recover. Some examples include:

- ASX terminating message gateways;
- client nodes; and
- networking.

3.2.2 Performance Testing during System Test window

Performance testing is an optional test phase in response to market feedback from the [October 2020 response to consultation feedback](#).

ASX will provide testing tools that will allow software providers to conduct performance testing on their interface(s) to the CHES replacement system under workload. The testing required will depend on the connection method chosen, with the end goal of eliminating performance bottlenecks with their interface(s) by obtaining volume metrics on how their systems interact with each interface point- AMQP, FIX or Ledger API.

Each software provider will be requested to provide their performance test schedule to manage potential impacts to other users.

ASX will provide further details on the volume of messages permitted during various stages of ITE1 in a subsequent release.

As some software vendors use the IPSEC VPN (internet) connectivity option, any performance tests can only be treated as indicative as their clients may use ASX Net, however if they can meet their own performance benchmarks using IPSEC VPN there is a level of assumption this will operate on an equal or higher basis if their clients use ASX Net in higher environments.

For performance testing, only the interface is in scope and not the performance of a software providers 'host system' or that of the CHES replacement system.

3.2.2.1 Simulated Network Outage Testing during the System Testing window

ASX will periodically schedule simulated network outage testing for software providers. It is expected that software providers test their system/interface network outage process to ensure that their systems can reconnect and data integrity is retained.

The table below summarises key points related to System Testing which includes Performance and Simulated Network Outage Testing.

	Description
Environment/s	ITE1
Entry Criteria	<p>Software providers must be existing CHES Users or their appointed vendors. New CHES Users must contact support. Refer to Support for ITE for details on how to contact support.</p> <p>Software providers should ensure that they are appropriately prepared and have internally tested their software prior to entering the system testing phase.</p>
Success Criteria	Successful completion of all technical accreditation tests.

3.2.2.2 Inflight Migration Testing

Inflight migration testing is an optional test phase in response to market feedback from the [October 2020 response to consultation feedback](#). The objective is to provide software providers the opportunity to test workflows that starts in CHES and completes in the CHES replacement system (e.g. a trade registered in CHES on the Friday before cut-over weekend will settle in CHES replacement system). It will also support the ability to test the subsequent modification of data in CHES that has been migrated to the CHES replacement system (e.g. accounts and holdings). This phase is targeted only to those software providers developing software for clearing and settlement and settlement only participants. As this phase is aimed at preparing for cutover, it is not relevant to AMOs, payment providers, share registries and PISPs as the transactions they participate in are not anticipated to be considered 'inflight'.

To support this test phase, ASX will introduce two new environments, a CHES Business-As-Usual (BAU) Test environment (for source data) and an Industry Test Environment - Migration (ITE-M).

Inflight migration testing and ITE-M will be available to both software providers and CHES users, though will be scheduled separately. Software providers will initially conduct inflight migration testing during system testing. CHES users will then be provided access to ITE-M to conduct inflight migration testing during CHES user testing.

A schedule will be provided closer to the Industry Test Stage in the ITE-M release of the Guide to Testing Services which will be published at a later date as per the Documentation Release Plan.

In-flight migration is targeted at software providers and CHES users that have workflows that start in CHES and finish in CHES replacement system. Therefore the test users are Clearing and Settlement Participants (i.e. not PISPs, share registries or AMOs).

ASX will populate the CHES BAU Test environment with UICs, security reference data and relevant corporate action events. Software providers will then enter their own accounts, holdings and settlement obligations data. Based on a schedule, that is to be provided, ASX will migrate this data into the new ITE-M environment. Software providers will then have the opportunity to access this data either for the use in subsequent workflows (e.g. settlement) or to create updates (e.g. accounts or holdings).

The test coverage includes:

- accounts (including the move from CHES proprietary registration standards to ISO 20022);
- holdings including sub-positions;
- scheduled settlement obligation including full and partial fails; and
- corporate actions (ASX will provide and publish a limited set of corporate actions as part of Inflight Migration)

This phase will also allow software providers to test the new netting and settlement changes, validating the workflow which starts in CHES and completes in CHES replacement system.

The table below summarises key points related to Inflight Migration Testing

	Description
Environment/s	Dedicated CHES BAU Test Environment + ITE-M
Entry Criteria	Software providers will need to have functionally tested their core functions in ITE1, prior to testing the relevant workflows for data migration in ITE-M.
Success Criteria	Software providers should have successfully demonstrated they have achieved their internal test plans for pre-defined migration scenarios.

3.2.3 Technical Accreditation

Technical accreditation is an existing formalised process which ensures all systems that connect to an ASX platform conforms to both the functional and non-functional requirements of ASX. Technical accreditation is a mandatory requirement for all systems connecting to the CHES replacement production environment and is the responsibility of the software provider to perform. Technical accreditation forms part of a broader set of requirements that help ensure the stability and orderly operation of the clearing and settlement facility and is a prerequisite to the operational readiness phase.

Technical accreditation will cover connectivity and messaging with the CHES replacement system, ensuring the technical stability of customer software and the clearing & settlement facility.

Technical accreditation is not intended to demonstrate that the host system is functionally compliant with the end to end workflow of the CHES replacement system as this is covered through operational readiness testing.

It is important to note that successful technical accreditation testing does not imply that the tested system complies with ASX rules and procedures, which include, but are not limited to [ASX Clear Operating Rules](#) and [ASX Settlement Operating Rules and Guidance Notes](#).

While customers are always encouraged to perform regular technical accreditation testing, they must repeat accreditation testing of their software in these circumstances:

- when system providers modify their software in a way that may affect or directly impact either, connectivity to the CHES replacement system or the generation of message constructs;
- to accommodate a new CHES release, where message constructs are introduced or upgraded;
- during extended periods of absence when the software is not connected to ASX; and
- upon specific request from the ASX.

ASX requests system providers to keep ASX up to date on their current software versions, regardless of whether re-accreditation is required.

Further details regarding technical accreditation will be published at a later date in the CHES Replacement Technical Accreditation Guide as per the Documentation Release Plan.

3.2.3.1 Technical Accreditation Scenarios

Software providers will be responsible for completing technical accreditation scenarios via all channels associated with their application (CHES user) requirements. CHES users will be required to use a successfully accredited system to complete operational readiness.

Technical accreditation includes connectivity, simulated network outage and recovery and messaging testing. The available connectivity options for CHES users include Ledger API, FIX, AMQP and SWIFT.

3.2.3.2 Self-Accreditation

Software providers perform the majority of the accreditation test unassisted. Once complete, they would advise ASX Technical Support of the start and end times of the self-test, along with instruments used and other details requested in the checklist for the test. ASX Technical Support will then validate and verify the result to produce a pass or fail report. For contact details, refer to [Support for ITE](#).

3.2.3.3 Assisted Technical Accreditation

Once self-accreditation is complete and a pass is verified by ASX Technical Support, software providers will need to book a test slot with ASX Technical Support, where they will complete the ASX-assisted test scenarios, guided by a member of the ASX Technical Support team. If testing is not completed within the test slot, the software provider will be required to rebook.

The table below summarises key points related to Technical Accreditation.

	Description
Environment/s	ITE1
Entry Criteria	Software providers to have run all technical accreditation scenarios successfully during system testing.
Exit Criteria	The software providers must demonstrate to ASX’s satisfaction that all mandatory technical accreditation scenarios have passed the success criteria.
	If a customer fails a mandatory section of the technical accreditation, the full technical accreditation suite will need to be re-tested.

3.3. Software provider test kits and test tooling for ITE1

3.3.1 3.3.1 Software Provider Test Data and Kits

Software providers will be allocated their own unique CHES test kit which allows them the ability to test independently.

Each test kit contains a list of dedicated UICs and securities that allow developers to test any CHES role. This allows software providers to act as the counterparty in multi-party scenarios, thus allowing for the testing of all workflows. By allocating unique securities, software providers have the ability to test certain functions without interference from others. This is particularly important for the testing of batch settlement where a common set of securities can result in a failure to deliver stock.

Test kits will be supplied as part of the on-boarding process. Multiple kits may be provided if there is a business case for doing so (for example a vendor supports multiple systems).

Further details regarding test data and kits will be published at a later date in the Guide to Testing Services as per the Documentation Release Plan.

3.3.2 Test Tooling

ASX will provide a number of test tools to assist software providers with their testing. Software providers will need to test all workflows associated with the CHES users they are supporting. To allow software providers to test these workflows, particularly where other CHES user types are required, ASX has developed a number of test tools to either initiate workflows or to respond to requests.

Test tools support:

- multi-party workflow; and
- non-functional testing (for example performance).

Test tools can be categorised as follows:

- **Self-service tools** to allow one CHES user type to initiate the workflow of another;
- **Auto-responders** to automate the response of a request; and
- **Auto-injectors** to automate the start of a workflow.

The CHES User Interface (UI) will be another feature available in ITE1 to assist software provider testing, with the below roles supported:

- **CHES user** - software providers can use the CHES UI to impersonate the role of another CHES user as part of multi-party workflow; and
- **ASX Operations** - For a small number of agreed scenarios, ASX will, on request use the CHES UI to initiate certain business events.

Additionally a list of actions which a software provider can request ASX to action on their behalf will also be in a subsequent technical documentation release.

4. CHES User Readiness

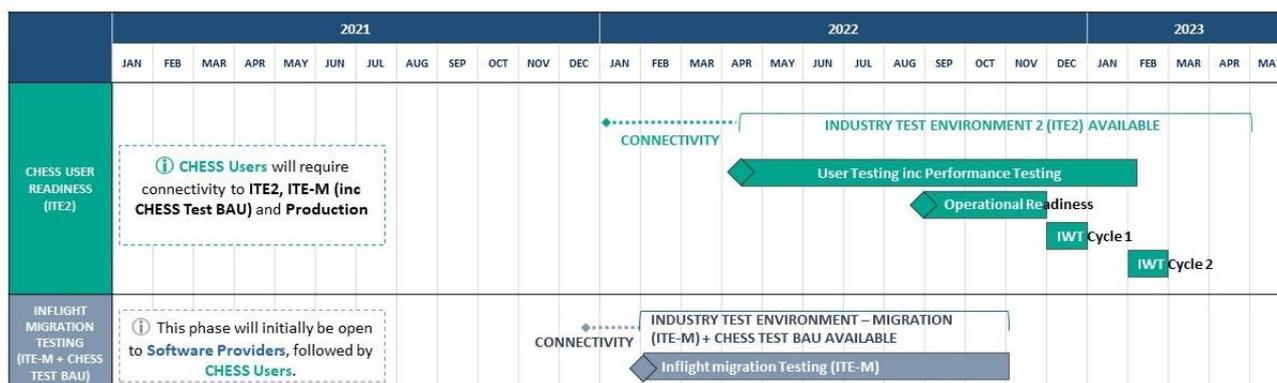
4.1. Overview of CHES User Readiness Testing

CHES users refers to clearing and settlement participants, product issuer settlement participants (PISPs), approved market operators (AMOs), payment providers and share registries.

In order to support CHES user readiness testing, CHES users will share a dedicated Industry Test Environment for each phase of testing, Industry Test Environment 2 (ITE2) and Industry Test Environment Migration (ITE-M), allowing CHES users to test functional and non-functional capabilities. Additional information on the environments may be found in Section 5.

Testing by CHES users is conducted across four phases:

- CHES User Testing (ITE2);
- Inflight Migration Testing (ITE-M);
- Operational Readiness (ITE2); and
- Industry Wide Testing (IWT) (ITE2).



Details on the forward plan for supporting documentation are provided in Section 6.3.

4.2. Phases of CHES User Readiness Testing

4.2.1 CHES User Testing

4.2.1.1 Functional User Testing

Functional user testing will allow CHES users to become familiar with new or upgraded systems delivered by their software provider/s. This includes any functionality changes, integration with internal upstream, downstream and reporting systems as well as undertaking internal testing to provide confidence to enter the operational readiness phase.

As a minimum requirement, CHES users are to complete a set of test scenarios provided by ASX, detailed in the Operational Readiness Guide. In addition, CHES users may choose to perform additional test scenarios to meet their own business requirements. This enables CHES users to develop their processes and procedures in preparation for the operational readiness phase and go-live.

Further details regarding test scenarios will be published at a later date in the Operational Readiness Guide as per the Documentation Release Plan.

CHES users will be able to functionally test their systems with CHES Replacement, examples include:

- account management;
- market events (corporate actions);
- transfers and conversions;
- trade registration;
- batch back-out;
- batch settlement;
- collateral management;
- mFund; and
- reporting.

ITE2 will be designed to enable a combination of self-serve testing and the opportunity for bilateral testing. CHES users will largely operate in ITE2 as their production-equivalent user and all users will have access to a common set of securities to use within their test scenarios. Corporate action events will be managed to a calendar that will be available to ITE2 users to ensure that all market scenarios can be rehearsed throughout the test phases.

4.2.1.2 Performance Testing During the User Testing Window

Performance testing is an optional test phase in response to market feedback from the [October 2020 response to consultation feedback](#).

ASX will provide test tools (e.g. for trade ingest and holding adjustments) that will allow CHES users to conduct performance test scenarios.

ASX will provide testing tools that will allow software providers to conduct performance testing on their interface(s) to the CHES replacement system under workload. The testing required will depend on the connection method chosen, with the end goal of eliminating performance bottlenecks with their interface(s) by obtaining volume metrics on how their systems interact with each interface point- AMQP, FIX or Ledger API.

This phase is not testing the performance of a CHES user's host system or that of the CHES replacement system.

Performance tests can only be treated as indicative for CHES users leveraging the IPSec VPN connectivity option.
Performance business processes are to be provided in a subsequent release.

4.2.1.3 Simulated Network Outage Testing During the User Testing Window

ASX will coordinate simulated network outage testing to allow CHES users. It is expected that CHES users test their system/interface network outage process to ensure that their systems can reconnect and data integrity is retained.

The table below summarises key points related to CHES user testing including Performance and Simulated Network Outage Testing

	Description
Environment/s	ITE2
Entry Criteria	<ul style="list-style-type: none"> • CHES users to have completed ITE2 Connectivity; • CHES users to have been onboarded successfully into ITE2; • CHES users have prepared their own test scripts to execute during User Testing, using operational readiness scenarios as minimum criteria; • CHES users have appointed primary technical and operational contacts for ASX to work with during ITE2 activities (user testing & operational readiness); and • if participating in performance testing, CHES users have prepared their own test scripts to execute during Performance Testing
Success Criteria	Successful completion of their own test scripts including the minimum requirements (operational readiness scenarios) set by ASX.

4.2.2 Inflight Migration Testing

Inflight migration testing is an optional test phase in response to market feedback from the [October 2020 response to consultation feedback](#). The objective is to provide CHES users with the opportunity to test workflows that start in current CHES and complete in the CHES replacement system (e.g. a trade registered in CHES on the Friday before cut-over weekend will settle in the CHES replacement system). It will also support the ability to test the subsequent modification of data in CHES that has been migrated to the CHES replacement system (e.g. accounts and holdings).

To support this test phase, ASX will introduce two new environments, a CHES Business-As-Usual (BAU) Test environment (for source data) and an Industry Test Environment - Migration (ITE-M).

Inflight migration testing and ITE-M will be available to both software providers and CHES users, though will be scheduled separately. Software providers will initially conduct inflight migration testing during system testing. CHES users will then be provided access to ITE-M to conduct inflight migration testing during the CHES user testing phase.

This specific schedule will be provided closer to the Industry Test Stage in the ITE-M release of the Guide to Testing Services which will be published at a later date as per the Documentation Release Plan.

In-flight migration is targeted at software providers and CHES users that have workflows that start in CHES and finish in CHES replacement system. Therefore the test users are Clearing and Settlement Participants (i.e. not PISPs, share registries or AMOs).

ASX will populate the CHES BAU Test environment with UICs, security reference data and relevant corporate action events. CHES users will then enter their own accounts, holdings and settlement obligations data. Based on a schedule, that is to be provided, ASX will migrate this data into the new ITE-M environment. CHES users will then have the opportunity to access this data either for use with subsequent workflows (e.g. settlement) or to create updates (e.g. accounts or holdings).

The test coverage includes:

- accounts (including the move from CHES proprietary registration standards to ISO 20022);
- holdings including sub-positions;
- scheduled settlement obligation including full and partial fails; and
- corporate actions (ASX will provide and publish a limited set of corporate actions as part of Inflight Migration).

This phase will also allow CHES users to test the new netting and settlement changes, validating the workflow which starts in CHES and completes in CHES replacement system.

The table below summarises key points related to inflight migration testing

	Description
Environment/s	Dedicated CHES BAU Test Environment + ITE-M
Entry Criteria	CHES users will need to have functionally tested their core functions in ITE2, prior to testing the relevant workflows for data migration in ITE-M.
Success Criteria	Successful completion of the CHES users' migration scenarios.

4.2.3 Operational Readiness

Operational readiness is the a formal phase that will require evidence and sign off in order to successfully exit out of the CHES user readiness stage. Refer to Section 4.3 for the full list of what is required in order for CHES users to go-live.

Operational readiness provides ASX assurance that CHES users are ready for go-live and that they are able to successfully operate their Business As Usual (BAU) functions using the CHES replacement system. By the completion of the operational readiness test phase, CHES users will demonstrate the completion of required end-to-end business

flows using accredited software. This is possible by proving they are able to complete the required operational scenarios for their particular CHES user type (including both positive and exception handling). The operational readiness scenarios will be published to the market by the end of 2021 to provide sufficient time for CHES users to prepare their ITE2 test activities throughout 2022. As part of the operational readiness assessment, CHES users will be required to provide evidence that they have sufficient processes in place for all BAU functions that they perform.

CHES users will be able to functionally test their systems with CHES Replacement, examples include:

- account management;
- market events (corporate actions);
- transfers and conversions;
- trade registration;
- batch back-out;
- batch settlement;
- collateral management;
- mFund; and
- reporting.

The table below summarises key points related to operational readiness.

	Description
Environment/s	ITE2
Entry Criteria	<ul style="list-style-type: none"> • Software provider has delivered accredited software to the CHES user and the CHES user has deployed to own test environment (Successful Accreditation); • CHES users to have successfully tested all operational readiness scenarios in the user testing phase, prior to formal operational readiness; • CHES users have prepared test scripts to execute during operational readiness; and • CHES users ready to support end-to-end business flows, which may include integration of surrounding systems.
Exit Criteria	Successful completion of all operational readiness scenarios for the CHES user as determined by ASX.

4.2.3.1 Operational Readiness Sample Scenarios

As part of the tools to help CHES users with testing, ASX will be publishing to the market various test scenarios which they are expected to complete. The below is a sample of the test scenarios to be provided.

The full list of Operational Readiness Scenarios will be published at a later date in the Operational Readiness Scenarios document as per the Documentation Release Plan.

Scenario Code	Feature	Scenario Precondition	CHES User Action
CS-001	Account (HIN) and Holder Update (Modification) and Cancellation	Clearing and Settlement Participant has created an account (HIN) and holder which has an 'Active (ACTV)' status.	Internal process and procedures are established for the following: <ul style="list-style-type: none"> • update an account (HIN) and holder; and • cancellation of an account (HIN) and holder.
CS-002	Update and/or Delete - Tax File Number TFN/ABN	Clearing and Settlement Participant has created	Internal process and procedures are established for the following:

		an account (HIN) and holder which has an 'Active (ACTV)' status.	<ul style="list-style-type: none"> • update and/or delete a TFN/ABN that is accepted by the Issuer (Registry).
CS-003	SRN Enquiry - Accept and Reject	Clearing and Settlement Participant has an account established with a valid registration identifier (RGID).	<p>Internal process and procedures are established for the following:</p> <ul style="list-style-type: none"> • initiate a SRN Enquiry request that is accepted by the Issuer (Registry); and • initiate a SRN Enquiry request that is rejected by the Issuer (Registry).

4.2.4 Industry Wide Test (IWT)

Industry Wide Test (IWT) is a test phase introduced in response to market feedback from the [October 2020 response to consultation feedback](#).

The primary purpose of industry wide testing is to provide the opportunity for CHES users to participate in a simulated production-like working environment. ASX will facilitate a mandatory, co-ordinated industry-wide end-to-end test to provide CHES users the ability to perform their business related functions with other counterparties.

ASX will run at a minimum two cycles during the IWT phase which will allow CHES users an opportunity to participate and transact with their cohort in a controlled and supported environment. ASX will assist in co-ordinating counterparties and provide scheduled market events including batch settlement and corporate action events to ensure that all CHES users have the ability to successfully perform their required minimum functional scenarios. This will also enable the industry to perform testing as a “day in a life” in clearing and settlement functions across all users. The goal is to provide CHES users with the assurance that they, their counterparties and ASX are ready to operate end to end functional processes in a market like environment.

CHES users will have the opportunity to simulate bilateral and market-wide operational functions with their counterparts in a semi-scripted manner.

CHES users will be required to provide sign-off on each IWT cycle they participate in to prove that they are satisfied and comfortable running their business functions with other CHES users and are ready for go-live.

The table below summarises key points related to IWT.

	Description
Environment/s	ITE2
Entry Criteria	CHES users to have successfully tested and evidenced all operational readiness scenarios required for their user type as part of operational readiness.
Exit Criteria	Successful completion of at least one cycle of IWT.

4.3. Attestation

Attestation is the final confirmation from all CHES users that they are technically and operationally ready for go-live.

CHES users must attest that they have completed all mandatory test phases.

An attestation must be signed off by an authorised CHES user representative and provided to ASX after the final migration dress rehearsal.

CHES users must provide attestation that they:

- are performing their end-to-end business flows on accredited software;
- have completed the exit criteria for operational readiness;
- have completed the exit criteria for in IWT; and
- successfully participated in three Migration Dress Rehearsals.

4.4. Test tooling for ITE2

All test tools (including self-serve tools, auto-responders and auto-injectors) available in ITE1 for software provider testing will also be available in ITE2 for CHES users. There may be additional test tools in ITE2 given ITE2 is planned to be an integrated environment with both upstream and downstream systems connected. ITE2 also provides the opportunity for bilateral testing.

In order to support production-like workflow testing, ITE2 will have a level of integration to facilitate customer E2E workflows and enable management of corporate events over the period of ITE2 activity. In order to seed and synchronise ITE2 with all integrated systems, ITE2 will be seeded with a subset of production static data with supplementary data created to support test scenarios.

Additional details will be published the CHES User Guide at a later date, as per the Documentation Release Plan.

5. Industry Test Environments

5.1. Characteristics of the Industry Test Environments (ITEs)

ITE1 and ITE2 share the same characteristics and will be provided on production grade infrastructure:

- single dedicated shared environment;
- availability of CHES User Interface (UI);
- production style authentication model;
- third party certificate signing authority;
- multi-site/multi-node topology across ASX's data centre; and
- ability to test with other participants (ITE2 only).

From a functional perspective the clearing and settlement functionality available is as follows:

- account management;
- market events (corporate actions);
- transfers and conversions;
- trade registration;
- batch back-out;
- batch settlement;
- collateral management;
- mFund; and
- reporting; and
- non-functional requirements (performance testing and failover and recovery).

ITE-M is a low spec environment that will be used to support Inflight Migration testing, or test scenarios relating to workflows in flight at the point of migration:

- single shared environment that will be used at different times, first by Software Providers then at a later point, CHES Users;
- availability of CHES User Interface (UI);
- production style authentication model;
- third party certificate signing authority; and
- single-site.

High level functional scenarios include:

- accounts (HINS) – including Registration Details;
- holdings - including sub-positions (specifically takeovers and option covers);
- inflight transactions (transactions that commence workflow in CHES but complete in CHES replacement system). Each scenario may be required to be repeated with an active corporate action, for example a trade booked on Friday is against a stock code going 'ex' on the same day.

5.2. Connectivity and On-boarding to ITE

All connectivity networks and access methods will be available from the opening of each ITE environment.

Connectivity Network	Access Methods
ASXNet*	<ul style="list-style-type: none"> Ledger API (Node Access) AMQP (ISO 20022 XML Messaging) CHESS User Interface FIX (Approved Market Operators only)
SWIFTNet	<ul style="list-style-type: none"> SWIFT (ISO 20022 XML Messaging)

*Including IPSec VPN, Switch in Cabinet and Cross Connect.

The choice of software to connect into ITE2 resides directly with each CHESS User.

CHESS Users should note they are required to enter ITE2 with their 'to-be' production systems and connectivity options.

5.2.1 On-Boarding

On-boarding for Software Provider System Testing, CHESS User Testing and Inflight Migration Testing refers to the steps required to provide access to respective environments, ITE1, ITE2 and ITEM. This includes:

- Network Connectivity Provisioning - this involves ASX, software providers and CHESS users configuring and testing the links between their respective data centers. This relates to the configuration of ASX Net sites for Ledger API, AMQP and FIX users. For any SWIFTNet clients, this refers to the provision of the participants into the SWIFT CUG (Closed User Group).
- Security authentication - Authentication certificates will be exchanged between ASX and software providers or CHESS users. This security process will enable secure access to the CHESS replacement system. Participants will be able to create and load security certificates into the ASX CSAM portal. A TLS (Transport Level Security) certificate is required for those using Ledger API, AMQP or FIX, this provides privacy and data integrity in all information shared. Additional certificates are required for ISO 20022 message signing (AMQP) and Token Acquisition (Ledger API) to provide further security around user authentication.
- Test Kit Allocation (ITE1 only) - Within the ITE1 environment all organisations will be allocated one (or more) test kits. These test kits provide UIC and security codes that are unique to each test kit and allows software providers to develop and test in an integrated environment without impacting the testing of others.

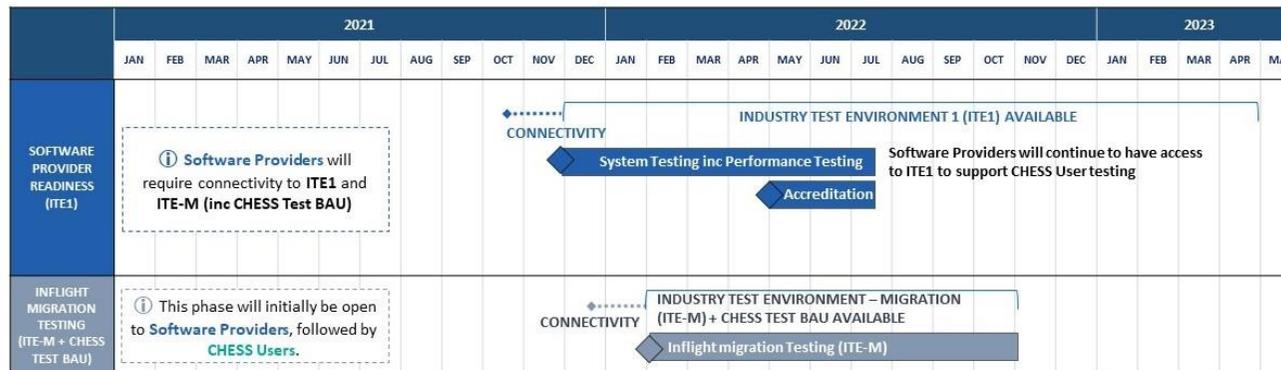
The first step of the onboarding process is for participants to complete an ITE Application Form, found here. Completed application forms are required to allow subscribers to connect to the Industry Test Environment (ITE). ASX encourages customers to have all completed order forms submitted at least four weeks prior to the opening of any relevant ITE. ASX cannot guarantee customers setup for ITE open for any forms received after this time.

6. Documentation Release Plan

6.1. Overview of Deliverables for Industry Testing

In order to support organisations conducting industry testing, ASX will provide documentation to the following schedule.

6.2. Software Provider Readiness Timeline



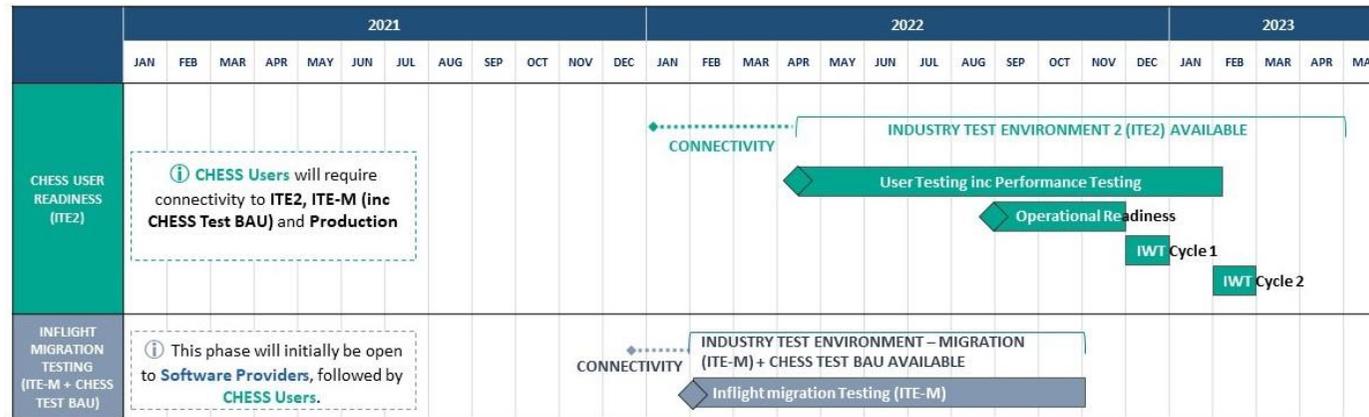
Software Provider Readiness support documentation, entry and exit timelines.

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
Connectivity Guide	System Testing (ITE1) Inflight Migration Testing (ITE-M)	Details the technical connectivity requirements for customers to connect to CHESSTest replacement system across all Industry Test Environments Key chapters: <ul style="list-style-type: none"> environment overview; connectivity methods; network details; and security details. 	Software providers and CHESSTest users.	<ul style="list-style-type: none"> End July 2021 for ITE1 content End September 2021 for ITE-M content

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
Security Guide [for ITE1]	System Testing (ITE1) Inflight Migration Testing (ITE-M)	Details of security settings to access ITE1 and ITE-M will be provided directly to each organisation as they connect to each environment.	Software providers and CHES users.	Issued directly to each organisation upon application to access one of the testing environments.
Guide to Testing Services	System Testing (ITE1) Inflight Migration Testing (ITE-M)	<p>Relevant for all phases of Industry Testing.</p> <p>Provides software providers all necessary information on the relevant phases of Industry Testing in order for organisations to plan and operate ITE1 and ITE-M.</p> <p>Key chapters:</p> <ul style="list-style-type: none"> • phase overviews; • environment details including availability, system events; • test kits, set-up and tooling; • workflow and message description; • performance testing guidelines; • failover testing guidelines; and • inflight migration testing guidelines. 	Software providers are the target audience, however CHES users may also be interested in the content.	<p>End August 2021 for software provider phases</p> <p>End November 2021 for performance testing and Inflight Migration chapters</p>
Failover and Recovery Guide	System Testing (ITE1)	Information relating to failover testing, what components will fail and proposed frequency.	Software providers are the target audience, however CHES users may also be interested in the content.	End August 2021

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
CHES UI User Guide	System Testing (ITE1)	<p>This documentation provides details on the new features, business functionality available when using the new CHES User Interface browser.</p> <p>This user guide covers:</p> <ul style="list-style-type: none"> • onboarding and security; • technical details - supported browsers, accessibility; and • CHES UI features - accounts, settlement instructions, payments, mFunds, message centre, workflow user management. 	Software providers and CHES users.	End September 2021
Accreditation Guide	Technical Accreditation (ITE1)	<p>Provides an overview of the CHES Replacement technical accreditation test phase and sets expectations regarding conduct and expected results.</p> <p>Key chapters:</p> <ul style="list-style-type: none"> • technical accreditation process; • connectivity scenarios; • message scenarios; and • assisted scenarios. 	Software providers, as required to complete the Technical Accreditation stage gate.	End November 2021

6.3. CHES User Readiness Timeline



CHES User Readiness support documentation, entry and exit timelines:

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
Updated Connectivity Guide [to include ITE2] (see above)	User Testing (ITE2)	Details the technical connectivity requirements for customers to connect to CHES replacement system across all Industry Test Environments Key chapters: <ul style="list-style-type: none"> environment overview; connectivity methods; network details; and security details. 	CHES users	End of September 2021

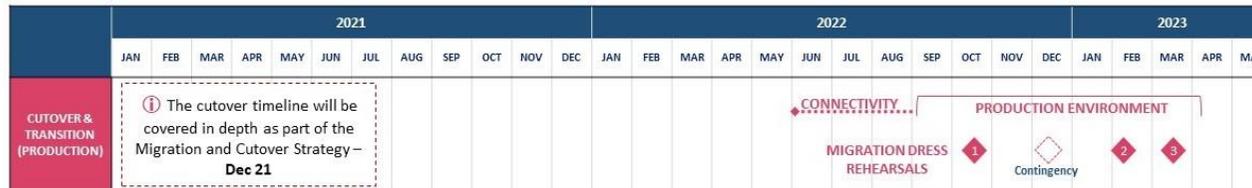
Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
Security Guide [for ITE2] (see above)	User Testing (ITE2) Dress Rehearsals (To Be Prod)	Details of security settings to access ITE2 will be provided directly to each organisation as they connect to each environment.	Software providers and CHES users	Issued directly to each organisation upon application to access one of the testing environments.
CHES UI User Guide	User Testing (ITE2) Operational Readiness (ITE2) IWT (ITE2) Migration Dress Rehearsals (To Be Prod)	This documentation provides details on the new features, business functionality available when using the new CHES User Interface browser. This user guide covers: <ul style="list-style-type: none"> onboarding and security technical details - supported browsers, accessibility CHES UI features - accounts, settlement instructions, payments, mFunds, message centre, workflow user management. 	Software providers and CHES users	CHES UI connectivity information is already published here . The CHES UI User Guide is scheduled to be fully complete by the end of September 2021
ASX Procedures and Guidelines (APGs)	Operational Readiness (ITE2) IWT (ITE2)	Provides operational guidelines for all CHES User types (clearing & settlement, sponsorship participants, issuer (registries) and payment providers). CHES Users can use these guidelines as a base for establishing internal procedures that suit their business and processing systems.	CHES users, before conducting Operational Readiness	Most of the APG has already been published here . It is scheduled to be fully complete by the end of December 2021.
Operational Readiness Scenarios	User Testing (ITE2) Operational Readiness (ITE2)	Outlines operational readiness scenarios for each CHES user type including success criteria.	CHES users	End of December 2021

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
Updated Guide to Testing Services [to include ITE2] (see above)	User Testing (ITE2)	Relevant for all phases of Industry Testing. Provides CHES users all necessary information on relevant phases of Industry Testing in order for organisations to plan and operate ITE1 and ITE-M. Key chapters: <ul style="list-style-type: none"> • phase overviews; • environment details including availability, system events; • test kits, set-up and tooling; • workflow and message description; • performance testing guidelines; • failover testing guidelines; and • inflight migration testing guidelines. 	CHES users	End of January 2022
Updated Failover and Recovery Guide [to include ITE2] (see above)	User Testing (ITE2)	Information relating to failover testing, what components will fail and a proposed frequency. Further details on failover and recovery, to the Guide to Testing Services, if required.	CHES users	End of January 2022

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
User Guide	User Testing (ITE2) Operational Readiness (ITE2) IWT (ITE2)	Provides detailed information around how to operate within the environment through each phase of ITE2 - CHES User Testing, Operational Readiness and IWT Key chapters: <ul style="list-style-type: none"> customer interfaces; daily settlement cycle; daily environment schedule; tooling and data sets; market event schedule (eg corporate actions); and attestation guideline. 	CHES users	End of January 2022
Industry Wide Testing (IWT) Information Pack	IWT (ITE2)	Provides detailed information around the scope of each IWT cycle and detailed plan.	CHES users	End of September 2022

6.4. Cutover & Migration Timeline

Details around Cutover and Migration including Dress Rehearsals will be covered in detail as part of the Cutover and Migration strategy, due to be published externally December 2021.



Cutover and migration support documentation, entry and exit timelines:

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
Cutover and Migration Strategy	Planning Migration Dress Rehearsals (To Be Prod)	This deliverable will cover: <ul style="list-style-type: none"> introduction to the Cutover and Migration Strategy; details for the single cutover weekend approach; inflight transaction and how they will be handled; and indicative cutover weekend timeline. 	Software providers, CHES users and other interested parties	End of December 2021
Security Guide [for Cutover and Migration] (see above)	Migration Dress Rehearsals (To Be Prod)	Details of security settings to access CHES replacement will be provided directly to each organisation as they connect to each environment.	Software providers and CHES users	Issued directly to each organisation upon application to access one of the testing environments.

Document	Testing Phase	Purpose of Document	Audience	Target Date for External Publication
Updated Connectivity Guide [to include Cutover and Migration] (see above)	Migration Dress Rehearsals (To Be Prod)	Details the technical connectivity requirements for customers to connect to CHES replacement system across all Industry Test Environments Key chapters: <ul style="list-style-type: none"> • environment overview; • connectivity methods; • network details; and • security details. 	CHES users	End of July 2022
Migration Dress Rehearsal (MDRs) Overview	Migration Dress Rehearsals (To Be Prod)	The purpose of this document is to provide CHES users all relevant information required to prepare for the Migration Dress Rehearsals including key milestones across the weekend, success criteria, escalation and support contacts. Key chapters: <ul style="list-style-type: none"> • timing for key milestones across the cutover weekend; • communication plan and support contacts; and • entry and Exit criteria including Go / No Go measures. 	CHES users	End of July 2022
Cutover Weekend Runbook	Migration Dress Rehearsals (To Be Prod)	Provides CHES users key tasks and milestones with an outline of detailed steps including planned timing.	CHES users	Planned for publication 2 weeks out from each cutover event, as per below: <ul style="list-style-type: none"> • MDR1 - End September 2022 • MDR2 - End January 2023 • MDR3 - End February 2023

7. Summary of Industry Testing

This table is to assist software providers and CHESS users with a summarised reference guide. It does not introduce additional information or concepts which has not been covered in Sections 1-6.

Stage	Phase	Environment	Relevant Party/s	Entry Criteria	Exit Criteria	Optional / Mandatory	Relevant Subsequent Documentation
Software Provider Readiness	System Testing	ITE1	Software Providers	Software providers should ensure that they are appropriately prepared and have internally tested their software prior to entering the system testing phase.	Successful completion of all technical accreditation tests.	Mandatory	<ul style="list-style-type: none"> Connectivity Guide Security Guide Guide to Testing Services Failover and Recovery Guide CHESS UI User Guide
	Inflight Migration Testing	ITE-M	Software Providers	Software providers will need to have functionally tested their core functions in ITE1, prior to testing the relevant workflows for data migration in ITE-M.	Software providers should have successfully demonstrated they have achieved their internal test plans for pre-defined migration scenarios.	Optional	<ul style="list-style-type: none"> Connectivity Guide Security Guide Guide to Testing Services
	Technical Accreditation	ITE1	Software Providers	Software providers to have run all technical accreditation scenarios successfully during system testing.	The software providers must demonstrate to ASX's satisfaction that all mandatory technical accreditation scenarios have passed the success criteria.	Mandatory	<ul style="list-style-type: none"> Accreditation Guide

Stage	Phase	Environment	Relevant Party/s	Entry Criteria	Exit Criteria	Optional / Mandatory	Relevant Subsequent Documentation
CHES User Readiness	CHES User Testing	ITE2	CHES User	<ul style="list-style-type: none"> CHES users to have completed ITE2 Connectivity; CHES users to have been onboarded successfully into ITE2; CHES users have prepared their own test scripts to execute during User Testing, using operational readiness scenarios as minimum criteria; CHES users have appointed primary technical and operational contacts for ASX to work with during ITE2 activities (user testing & operational readiness); and if participating in performance testing, CHES users have prepared their own test scripts to execute during Performance Testing. 	Successful completion of their own test scripts including the minimum requirements (operational readiness scenarios) set by ASX.	Mandatory	<ul style="list-style-type: none"> Updated Connectivity Guide Security Guide Updated Guide to Testing Services Updated Failover and Recovery Guide User Testing User Guide Operational Readiness Scenarios CHES UI User Guide
	Inflight Migration Testing	ITE-M	CHES Users	CHES users will need to have functionally tested their core functions in ITE2, prior to testing the relevant workflows for data migration in ITE-M.	Successful completion of the CHES users' migration scenarios.	Optional	<ul style="list-style-type: none"> Connectivity Guide Security Guide Guide to Testing Services

Stage	Phase	Environment	Relevant Party/s	Entry Criteria	Exit Criteria	Optional / Mandatory	Relevant Subsequent Documentation
	Operational Readiness	ITE2	CHES Users	<ul style="list-style-type: none"> Software provider has delivered accredited software to the CHES user and the CHES user has deployed to own test environment (Successful Accreditation); CHES users to have successfully tested all operational readiness scenarios in the user testing phase, prior to formal operational readiness; CHES users have prepared test scripts to execute during operational readiness; and CHES users ready to support end-to-end business flows, which may include integration of surrounding systems. 	Successful completion of all operational readiness Scenarios for the CHES user as determined by ASX.	Mandatory	<ul style="list-style-type: none"> Operational Readiness Scenarios CHES UI User Guide ASX Procedures and Guidelines (APGs) Operational Readiness User Guide
	Industry Wide Testing (IWT)	ITE2	CHES Users	CHES users to have successfully tested and evidenced all operational readiness scenarios required for their user type as part of operational readiness.	Successful completion of at least one cycle of IWT.	Mandatory	<ul style="list-style-type: none"> CHES UI User Guide ASX Procedures and Guidelines (APGs) Industry Wide Testing (IWT) Information Pack IWT User Guide