



Failover and Disaster Recovery

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System response times may vary for a number of reasons including market conditions, trading volumes and system performance.

1 Introduction

Cboe Australia has implemented a trading system architecture that has been designed to provide redundancy and resiliency. This document provides a high level overview of this architecture and the associated system behaviours during Cboe’s failover process.

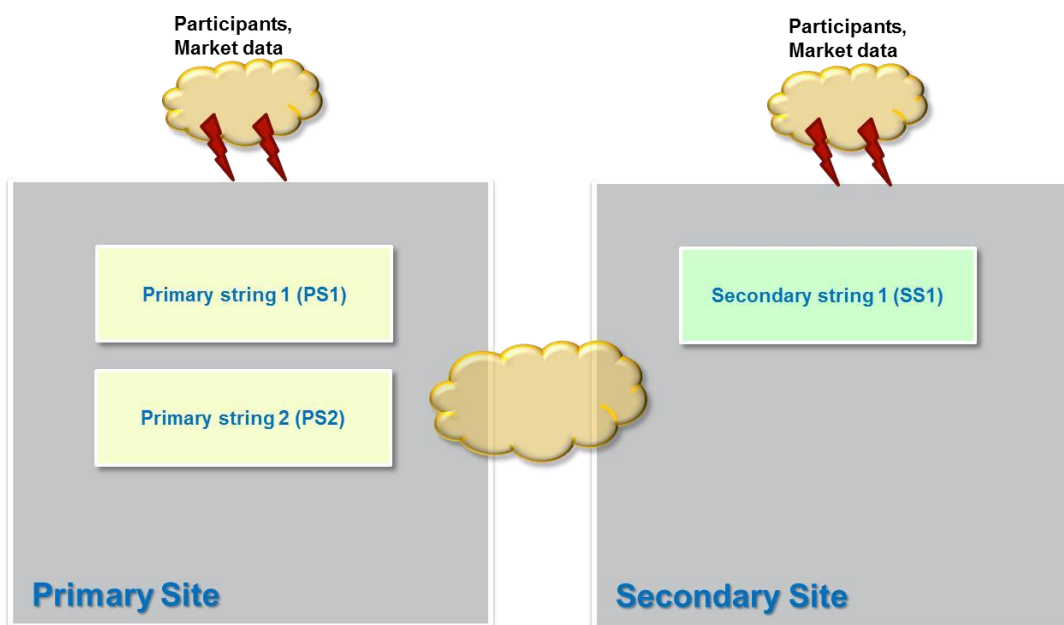
2 Cboe System Architecture

The Cboe trading platform is based on a high availability, fault tolerant design deployed across two sites in separate physical locations (Primary and Secondary) under an asynchronous configuration. The platform consists of two sets of the system (dual strings) in the primary site providing local redundancy and a backup system in the secondary site (single string) for failover. The design can be summarised as follows:

- ❖ Primary String 1 – online, primary site (Equinix)
- ❖ Primary String 2 – ‘hot’ standby, primary site (Equinix)
- ❖ Secondary String – ‘warm’ standby, secondary site (Globalswitch)

The online system in Primary String 1(P1) is synchronised with the standby system in Primary String 2(P2). All system components between these two strings are constantly monitored and automatic failover can occur at the process level to ensure minimal disruption to trading. In the event that both strings in the primary site fail Cboe is able to failover its operations to the backup site and initiate the failover and recovery process described below.

The diagram below provides a high-level overview of this architecture.



3 Failover Scenarios

Failure scenarios can be categorized in various ways, some of which are outlined below.

Individual Component Failure

Cboe runs key system components such as FIX gateways, market data and matching engine in synchronisation; an online instance and a hot-standby instance. If the online instance should fail the standby instance is automatically promoted to online resulting in no data loss.

Network Failure

Similar to the trading system, the network design incorporates redundancy.

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Total Primary Site Failure

In the event of a total primary site failure, Cboe may failover to the secondary site which is maintained asynchronously.

In order to maintain market integrity and enable participants to carefully manage their failover to the Cboe backup site, Cboe will perform a number of detailed verification steps to facilitate the participant failover and reconcile executed trade status with each participant.

Should such a failover be required, Cboe will communicate with both trading participants and vendors throughout the process.

During the failover process all open orders from the order book are purged (cancelled) and the order book is reset to an empty state. The status of trades executed by participants will be verified by Cboe operations staff.

Once the system verification and reset processes are completed by Cboe and participant connectivity and readiness to connect to the backup market is verified, then Cboe will reopen the market and trading will recommence.

Any further enquiries about the failover process can be directed to the Cboe Australia support team at au.support@cboe.com or +61 2 8078 1701