



News Release

19 July 2016

SGX provides further details on market disruption

1. Singapore Exchange's (SGX) securities market experienced a market disruption on Thursday, 14 July 2016, when the exchange ceased trading at 1138 hours, and remained closed for the rest of the day.
2. Investigations found that Thursday's event was caused by a disk failure and an application that did not detect the problem. The disruption was prolonged due to challenges in the orders and trade reconciliation process.

Cause and description of disruption

3. At 0938 hours, SGX detected Input/Output errors on a disk that runs the application to send out clearing confirmation messages to members. As the application did not detect the disk failure, which it should have, it did not automatically cutover to SGX's backup secondary system. SGX initiated a manual cutover from the primary to secondary systems at 1012 hours.
4. As a result of disk failure, some clearing confirmation messages were not generated. Following the cutover, the application attempted to resend all missed messages, which resulted in some messages being duplicated.
5. At this point, trading ceased at 1138 hours, and from 1151 hours members could reconcile and manage their orders including those which were traded. Trading was orderly throughout the time the market was open.
6. While there was a problem with the clearing confirmation messaging application, there was no problem with the trade confirmation messaging application, which had continued to work as normal. To reconcile their orders and trades, members can rely either on trade confirmation messages or clearing confirmation messages. Those using the latter in this case experienced problems with reconciling orders and trades.

Reconciliation process challenges

7. Order and trade reconciliation required SGX and its members to match their trade or clearing confirmation data files.
 - a. While SGX provided members with a complete set of data detailing all trades done prior to the adjust phase, specific, one-off data files on missing and duplicated clearing confirmation messages, for each member had to be generated. This was because members have different trade and order management systems and processes. These one-off files had to be newly generated by SGX.
 - b. SGX proceeded to work with each individual member to reconcile all trade and orders status to ensure that records in their respective trade and order management systems were

accurate. The entire process took longer than expected, as members use different systems, and either the trade confirmations or clearing confirmation messages, or both.

Remedial and follow up actions

8. The disk has been replaced on Thursday and complete health checks conducted.
9. We are working with our vendor to review the application which sends out clearing confirmation messages, and will implement the necessary changes to ensure detection by the application of specific hardware problems.
10. We will improve our process in data generation, and fine tune the data files to better enable our members in their reconciliation processes.
11. We will work with members to review their order and trade reconciliation process, to improve overall recovery and market resumption, in the event of a similar recurrence.
12. We will increase the number of our Business Continuity Planning scenarios which require industry-wide participation for reconciliation and recovery.

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About Singapore Exchange

Singapore Exchange is Asia's leading and trusted market infrastructure, facilitating the exchange of capital and ideas to create value for people, businesses and economies. As a multi-asset exchange operating equity, fixed income and derivatives markets to the highest regulatory standards, SGX is a vertically integrated business that provides listing, trading, clearing, settlement, depository and data services.

With about 40% of listed companies and 90% of listed bonds originating outside of Singapore as well as established linkages across the region and in Europe, SGX is Asia's most international and connected exchange. Offering a full suite of derivatives products across Asian equity indices, commodities and currencies, SGX is the world's most liquid offshore market for the benchmark equity indices of China, India, Japan and ASEAN.

The exchange was one of the first globally to adopt the Principles for Financial Market Infrastructure, the first and only central counterparty in the region to be fully approved by U.S. regulators as a Derivatives Clearing Organisation and a Foreign Board of Trade, and is recognised by European Union regulators for both securities and derivatives.

As Asia's pioneering central counterparty, SGX is globally recognised for its risk management and clearing capabilities. In 2015, SGX was awarded Derivatives Exchange of the Year by Asia Risk, Futures and Options World and Global Capital as well as Central Counterparty (CCP) of the Year by Asia Risk. In 2016, SGX was named Exchange of the Year at the global Energy Risk Awards.

Headquartered in AAA-rated Singapore, SGX has over 700 employees including offices in Beijing, Hong Kong, London, Mumbai, Shanghai and Tokyo. For more information, please visit www.sgx.com.

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