

For information

**Legislative Council Panel on Financial Affairs
Congestion in Securities Trading Networks**

Purpose

This paper sets out the responses of the Hong Kong Exchanges and Clearing Limited (HKEx), the Securities and Futures Commission (SFC) and the Hong Kong Monetary Authority (HKMA) to recent incidents of network congestion in securities trading experienced by banks and broker firms at times of heavy trading.

Background

2. Noting that some investors have experienced delay in executing buying and selling orders for a newly listed stock (Alibaba.com) in the morning of 6 November 2007, the Panel has asked the Administration and the relevant authorities to provide information to address the following questions and concerns:

- (a) an assessment of the extent or seriousness of the problem with reference to the frequency of occurrence and the number of investors / institutions affected (if known);
- (b) the causes for such network failures and measures to tackle the problem;
- (c) whether a coordinated strategy (comprising the work of the Government, SFC, HKEx and HKMA) is being adopted to ensure seamless online trading and if yes, the details of such plan, such as whether certain service standards should be prescribed for compliance by brokers/banks;
- (d) in anticipation of the growth in transactions resulting from

an increasingly active market and new initiatives such as the Qualified Domestic Institutional Investors (QDII) Scheme, what measures will be put in place to cope with the high trading volume, such as whether brokers/banks and HKEx will be required to enhance their system capacity; and

- (e) the impact of such network congestions resulting in delayed/unsuccessful transactions on investor confidence and on Hong Kong's status as an international financial centre.

Summary of the Responses

3. The Administration has invited HKEx, SFC and HKMA for their responses to Members' concerns above. According to HKEx, network congestion experienced by investors in executing buying and selling orders for a newly listed stock at market opening at 10:00 am on 6 November 2007 was mainly caused by an unprecedented volume of order submissions within a very short period of time. For instance, about 25% of the trades of the stock on 6 November were processed in the first 20 minutes of the trading session. Nevertheless, the situation only lasted for a short period of time and had improved significantly when the order submission rate for the stock started to subside at around 10:15 am. HKEx also pointed out that the allegations of certain Exchange Participants that the orders of the stock had a ten to fifteen minute response time from HKEx's trading system were invalid.

4. In general, the financial regulators are of the view that the securities trading system of HKEx and most financial intermediaries have demonstrated their abilities to cope with the recent surge in market activities and to handle some of the world's largest IPOs. The growing acceptance among investors of online securities trading services has reflected an increasing investor confidence in this channel of service delivery. The financial regulators fully recognize the importance of ensuring effective online trading. For instance, the HKEx has continuously upgraded its system capacity to cope with increasing market activities. The processing capacity of HKEx's trading system, i.e. the

Automatic Order Matching and Execution System / Third Generation (AMS/3) was increased from 1.2 million to 1.5 million trades per day when the peak historic rate had risen to about 0.5 million trades per day in early 2007. HKEx will further increase the trading capacity of AMS/3 from 1.5 million to 5 million trades per day in January 2008. The capacity can be increased further to 7.5 million trades per day in 2008 if necessary. In addition, HKMA has been monitoring the system utilization of on-line securities trading systems of major authorized institutions (AIs). The AIs are required to establish an effective and practical continuity plan to enable timely recovery and to provide alternative service delivery channels in case system disruptions occur.

5. The Administration has all along attached great importance to the stability and reliability of our financial infrastructure. Looking ahead, our financial regulators will continue their efforts to ensure that our securities trading system is well prepared for the anticipated growth in transaction volumes, which is crucial to Hong Kong in maintaining our position as an international financial centre.

6. The detailed response of HKEx and SFC is set out at **Annex A**. HKMA's response is at **Annex B**.

Financial Services and the Treasury Bureau
November 2007

**HKEx's and SFC's Response to Questions on
Network Congestion in Securities Trading
raised by the Legislative Council Panel on Financial Affairs**

Questions (a) and (b)

Overview

In general, execution of an investor order involves order entry into the front-end trading facility operated by a broker (eg Internet trading website, interactive voice responding system and call centre, etc) and subsequent order submission to HKEx's trading system, AMS/3, for order matching. To support order submissions by investors, brokers' systems perform many processing operations such as order validation, credit limit checking, stock balance verification, order transmission to AMS/3 and investor notification of order execution results, etc. As part of their business operations, brokers are responsible for managing the capacity of their trading facilities and order submission rates to AMS/3 (ie throttles). With more than 400 broker firms operating in Hong Kong, investors can choose the brokers with appropriate service levels and order execution capability.

When a new order is received by AMS/3, the broker's system will be acknowledged with a response immediately (first response) and the order is then immediately placed in a store and forward queue pending order matching by AMS/3. If the order is executed in the AMS/3 order book, the broker's system will be acknowledged with another response (second response).

Order submission of Alibaba on 6 November 2007

When the trading of Alibaba (stock code 1688) was debuted on 6 November 2007, an unprecedented volume of order submissions (including order inputs, order cancellations and order modifications) were recorded in AMS/3 in the first 20 minutes after the market opened at 10:00am. The number of order cancellations and modifications were particularly high as a result of the price

movements of Alibaba during that time (see table below for order details). It is noted that 384 Exchange Participants (EPs) or 90% of the total population submitted orders for Alibaba during this peak period with 50% of the orders contributed by the top 10 EPs, all being retail brokers.

Order submissions of Alibaba on 6 Nov 2007

	First 20 minutes		Whole day	
	No.	% of order	No.	% of order
Order inputs	56,005	66.4%	210,994	69.7%
Order rejections	6,324	7.5%	26,586	8.8%
Order cancellations and modifications	22,017	26.1%	65,088	21.5%
Total	84,346	100.0%	302,678	100.0%

Turnover and trades processed for Alibaba on 6 November 2007

Turnover value of Alibaba was about \$4 billion for the first 20 minutes and about \$17 billion for the whole day whereas the number of trades processed for Alibaba was about 30,000 for the first 20 minutes and 120,000 for the whole day. In other words, over 20% of the turnover of Alibaba and 25% of trades of Alibaba were successfully processed in the first 20 minutes (see the table below for a summary).

Turnover and trades of Alibaba on 6 Nov 2007

	As at 10:20 am		Whole day	
	No./HK\$	% of market	No./HK\$	% of market
Trades	30,000	20.0%	120,000	12.5%
Turnover	\$4 bn	16.0%	\$17 bn	10.0%

During the peak period, the maximum time for a second response for Alibaba orders was about 5.5 minutes. This situation lasted for several minutes until around 10:15am when the order submission rate for Alibaba started to subside.

The number of outstanding Alibaba orders in the store and forward queue was then gradually reduced to normal level at around 10:20am. Overall, AMS/3 and the associated communication network operated continuously and Alibaba orders were processed and trades executed continuously throughout this peak period.

It should be noted that comments by some EPs that Alibaba orders had a 10-15 minute response time from AMS/3 are invalid. HKEx understands that some brokers' systems experienced extended order processing delays during initial trading in Alibaba.

Question (c)

The SFC's (i) Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission, (ii) the Management, Supervision and Internal Control Guidelines for Persons Registered with or Licensed by the Securities and Futures Commission as well as (iii) the Guidance Note on Internet Regulation set out specific requirements and guidance on the operational capabilities of licensed or registered persons. In general, licensed or registered persons should have and employ effectively the resources and procedures which are needed for the proper performance of their business activities and more specifically they should handle / transmit orders for execution promptly and their computer systems should have sufficient operational integrity and address issues of security, reliability, capacity and contingency. The SFC also expects intermediaries to have a periodic review programme to comprehensively plan, test and monitor their computer systems' security, reliability and capacity.

Question (d)

HKEx continuously plans its systems capacity to cope with historical and projected future increasing market activities and keeps SFC informed of its capacity planning. In early 2007, the processing capacity for AMS/3 was increased from 1.2 million to 1.5 million trades per day at a time when the peak historic rate had risen to about 0.5 million trades per day.

HKEx is now in the process of replacing its existing host system CPUs in January 2008. The new CPUs have higher processing power to increase AMS/3 trading capacity from 1.5 to 5 million trades per day at a time when our peak historic rate has risen to about 1.2 million trades per day. Capacity can be increased further to 7.5 million trades per day in 2008 if necessary. The new CPUs also allow a five-fold increase in throughput for hot stocks. HKEx has promulgated the AMS/3 upgrade plan to the brokerage community. Mandatory market rehearsals will be arranged in early January 2008 and brokers will be required to verify their abilities to handle higher volume of order flow so that the market as a whole can further strengthen its readiness to support further growth in trading activities.

The following table summarizes some of the key initiatives regarding capacity upgrade of HKEx core market systems in the upcoming months.

HKEx capacity upgrade plan for its core market systems

System	Month	Processing capacity (in no. of trades)	
		From	To
AMS/3	Jan 2007	1.2 million	1.5million
	Jan 2008	1.5 million	5million
	4Q 2008	5 million	7.5 million
CCASS/3	Dec 2007	1.5 million	2.5 million
	Mar 2008	2.5 million	5 million
	4Q 2008 ¹	5 million	7.5 million
Market Data Feed	Jan 2008	1.5 million	5 million
	4Q 2008	5 million	7.5 million

¹CCASS/3 further capacity upgrade to 7.5 million trades will be initiated when trading volume approaches 5 million trades

Question (e)

HKEx has not received any comments from market practitioners on negative impact on investor confidence and on Hong Kong's status as an international financial centre due to the trading activities of Alibaba on 6 November 2007. The SFC also did not receive any complaint from investors. In fact, HKEx market systems and the entire Hong Kong securities markets have together

demonstrated their ability to cope with the recent surge in market activities and to handle some of the largest IPO's in the world ever (eg ICBC in 2006). The table below provides some high level statistics on market activities in 2007.

Key market statistics before / in 2007

	Total orders processed per day	Total trades processed per day	Total daily turnover
Peak - before 2007	1,719,958 (19 Dec 06)	504,155 (28 Dec 06)	\$79.0 billion (28 Aug 97)
Peak - during 2007	3,878,996 (3 Oct 07)	1,201,263 (3 Oct 07)	\$210.5 billion (3 Oct 07)
Listing date of ICBC	1,284,047 (27 Oct 06)	439,833 (27 Oct 06)	\$76.2 billion (27 Oct 06)
Listing date of Alibaba	3,716,113 (6 Nov 07)	963,718 (6 Nov 07)	\$170.4 billion (6 Nov 07)

**Securities and Futures Commission
Hong Kong Exchanges and Clearing Limited
November 2007**

**HKMA's Response to Questions on
Network Congestion in Securities Trading
raised by the Legislative Council Panel on Financial Affairs**

Question (a)

Since August 2007 when there was an upsurge in online securities trading, the HKMA has received 6 reported cases and 20 customer complaints regarding service disruptions of on-line securities trading systems. Five authorized institutions (AIs) were involved in the reported cases.

Information available to the HKMA shows a healthy growth in the take-up rate and utilisation of on-line securities trading channel. A survey conducted in mid-2007 indicates that the number of retail Internet banking accounts has increased by around 724,000 (20%) and the transaction volume has risen by 61% when compared with mid-2006. The HKMA therefore attaches great importance to the stability and reliability of on-line securities trading services provided by AIs and will continue to work with the banking industry to ensure that it is prepared for the anticipated growth in transaction volumes.

Question (b)

The service disruptions reported were largely caused by a sudden surge in on-line securities trading during the relevant time that exceeded the capacity planning parameters of AIs, or, to a lesser extent, faulty software or hardware components of the systems. The AIs concerned have taken immediate actions by upgrading the capacity of the systems and fixing the faulty system components. The AIs have also stepped up their monitoring of system utilisation and will continue to review the need to upgrade their capacities.

Question (c)

The HKMA has implemented a comprehensive technology risk supervisory framework since 2001 with ongoing focus on technology risk management and business continuity planning of AIs through issuance of guidelines, and conducting regular on-site examinations, supervisory control self-assessments and off-site reviews. With the upsurge of equities transactions in 2007, the HKMA has further strengthened the related supervisory measures. In particular, the HKMA has been monitoring the system utilisation of on-line securities trading systems of major AIs. Where AIs have encountered system-capacity issues, the HKMA will inform the AIs concerned to strengthen the capacity of their systems.

The HKMA also issued a circular on 16 October to remind the AIs offering retail Internet banking services to their customers to ensure their on-line securities trading systems can cope with the anticipated business growth. In particular, the AIs are required to step up their monitoring of the performance and capacity utilisation of the systems, and thoroughly review the systems to identify any potential weaknesses that may affect the performance and stability of the services, and to rectify the systems promptly when necessary. The AIs are also required to establish an effective and practical business continuity plan to enable timely recovery of on-line securities trading services in case system disruptions occur. Effective alternative service delivery channels (such as phone banking and manned customer service hotlines) should be provided to ensure an appropriate level of continuous service to customers.

Question (d)

In anticipation of the continued increase in the number of customers and the volume of transactions in the equity market, the HKMA will shortly commence a round of thematic examinations on system capacity and contingency planning for on-line securities trading services of selected AIs. It is to ensure that AIs have implemented effective and appropriate measures to address the issues. The HKMA will also continue its ongoing supervisory efforts such as performing off-site reviews.

Question (e)

The HKMA observed a growing acceptance among bank customers of on-line securities trading services and this reflected ongoing investor confidence in this channel of service delivery. The importance of ensuring effective and reliable services to customers is fully recognised and the HKMA will continue to work with the banking industry in this regard to strengthen Hong Kong's position as a leading international financial centre.

Hong Kong Monetary Authority
November 2007