SECURITIES AND FUTURES COMMISSION
證券及期貨事務監察委員會

SFC
證監會

Report on the Thematic Review of Alternative Liquidity Pools in Hong Kong

9 April 2018

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A. Introduction

1. The Securities and Futures Commission (SFC) conducted a thematic review of Alternative Liquidity Pools (ALPs) to assess whether licensed corporations (LCs) were in compliance with the requirements in Paragraph 19 and Schedule 8 of the Code of Conduct[1], which came into effect on 1 December 2015. The thematic review, conducted between 2016 and 2017, also facilitated the SFC's review of existing requirements for ALP operations and its understanding of the latest market developments in Hong Kong.

2. The scope of the thematic review primarily covered the following:
   - ALP overview
   - Management and supervision
   - User on-boarding and opt-in/opt-out arrangements
   - Qualified investor and client identity
   - User categorisation
   - Order routing and priority
   - Matching mechanisms
   - Risk management
   - Information for users
   - System adequacy
   - Contingencies
   - Market data
   - Record keeping
   - Reporting and notification obligations

3. The thematic review was conducted in two phases. A questionnaire was first sent to all ALP operators[2] in Hong Kong. In the second phase, a mix of ALPs with different business models were selected for review based on the information provided in the questionnaire.

4. The first part of this report is an overview of the ALP industry landscape in Hong Kong. The majority of ALPs only traded Hong Kong exchange-listed products and their execution prices were mostly within the best market bid and offer prices at the time the orders were crossed. Only around half of the ALP operators allowed proprietary and principal orders to be routed to their ALPs, and they ensured compliance with the order priority requirement in the Code of Conduct.

5. Many ALPs would post orders to both the ALPs and the exchange for more crossing opportunities. System controls were in place to cancel or amend the orders in the exchange when crossing opportunities were available in the ALPs or vice versa. Such an arrangement might alter the order priority in the ALPs. As such, ALP operators are expected to disclose such features and arrangements in their ALP Guideline[3] so that their users can make informed decisions.

6. It was common for some ALPs to route orders to third-party ALPs. However, such arrangements and the related opt-in and opt-out options might not be fully disclosed. ALP operators are expected to fully disclose this information in their ALP Guidelines as well as to bring the third party's ALP Guidelines to the attention of users.

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[1] Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission.

[2] At the time the thematic review commenced, there were 15 active ALP operators in Hong Kong.

[3] Paragraph 19.2(a) of the Code of Conduct defines ALP Guidelines as the guidelines that are required to be prepared by a licensed or registered person operating an ALP, for the purpose of providing guidance to the users of the ALP concerning its operation.

7. An instance was noted where an ALP operator failed to establish and implement measures to ensure ALP users were qualified investors, and also failed to provide users with sufficiently comprehensive information in their ALP Guidelines as required by the Code of Conduct. ALP operators are reminded to implement policies, procedures and controls to ensure they are in compliance with all relevant requirements in the Code of Conduct.

8. Together with the Circular to all Licensed Corporations on Alternative Liquidity Pools issued on the same day as this report, the SFC is providing the industry with a summary of the findings of the thematic review as well as examples of good practices and our overall expectations for ALP operations.

9. The SFC will continue to closely monitor market and regulatory developments in ALPs both in Hong Kong and overseas, and may propose further policy refinements and rule changes to maintain an appropriate balance between market innovation and investor protection.

B. ALP industry landscape in Hong Kong

1. Overview of ALPs in Hong Kong

a. Market overview

When the thematic review commenced, there were 16 licensed ALP operators in Hong Kong, 15 of which were active and were covered in the scope of the review through either providing responses to the questionnaire or being selected for review.

The majority of ALP operators only operated one ALP, with the exception of two which operated more than one ALP to facilitate users' specialised trading strategies. For example, ALP operators may segregate sources of liquidity into different ALPs so that users were provided with the flexibility to interact with specific liquidity providers. Also, some ALPs were designed with unique features including matching mechanisms to facilitate users' specialised trading objectives.

2/15 ALP operators operated more than 1 ALP

The majority of ALPs were developed and maintained in-house so that the intellectual property could be protected. Only one ALP was developed by a third-party service provider, but the ALP operator was responsible for ensuring compliance with regulatory requirements. For example, the ALP operator tested each of the modifications developed by the third-party service provider prior to implementation.

1/15 ALP operator operated an ALP which was developed by a third-party service provider

Most of the ALPs only allowed matching of Hong Kong exchange-listed securities. A small number of ALPs allowed matching of securities listed overseas.


11/15 ALPs traded Hong Kong exchange-listed securities only

As shown in the diagram below, the total turnover of ATS[4] transactions as compared to the securities market total turnover has been relatively low, only accounting for around 1% - 1.7% between October 2016 and September 2017.
Source: Hong Kong Exchanges and Clearing Limited

Total turnover of automated trading services (ATS) transactions

Legend: Total turnover of ATS Transactions — % of Securities Market Total Turnover
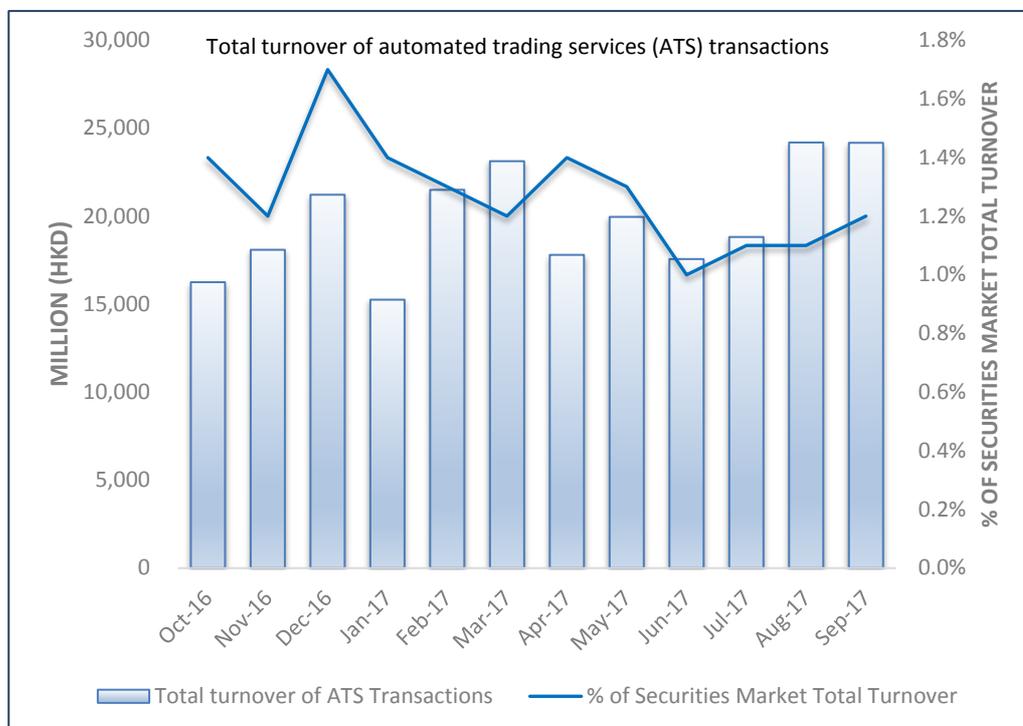
b.   Features and operation

The following are the highlights of common features and operations of ALPs in Hong Kong:

Opt-in / Opt-out
The commonly used on-boarding approaches to enable user access to ALPs were "opt-in" or "opt-out". Around half of the ALP operators adopted the "opt-in" approach, which required explicit users' consent prior to enabling the routing of users' orders to ALPs.

The other ALP operators adopted the "opt-out" approach where explicit users' consent was not required. These ALP operators were required to inform users that their orders would be routed to ALPs unless otherwise instructed by users.

Regardless of whether the "opt-in" or "opt-out" approach was adopted, users should be provided with comprehensive information about how their ALPs operate and the opt-out option as required under the Code of Conduct.

Hours of operation
The majority of ALPs mainly operated during the exchanges' continuous trading sessions. Only a few ALPs with unique business models allowed the crossing of orders outside continuous trading sessions.

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[4] ATS has the same meaning as "automated trading services" in Part 2 of Schedule 5 of the Securities and Futures Ordinance.

Order type

Typical order types available in the ALPs included market order (ie, order will be executed at the prevailing market price), limit order (order will be executed at the limit price or better) and pegged order (order can be pegged to best bid, best offer, or mid-price).

Order priority

Most ALPs employed an order prioritisation mechanism in the order of price, capacity (ie, non-proprietary/non-principal vs proprietary/principal) and time of the order. Some ALPs employed other order prioritisation mechanisms, for example, prioritising orders based on the size of the liquidity provided or allocating executed trades to users in proportion to the size of the order they placed.

12/15 ALPs prioritised orders in the order of price, capacity (ie, non-proprietary/non-principal vs proprietary/principal) and time

Order matching

The majority of ALPs only allowed execution prices at or within the best bid and offer prices of the exchanges, while other ALPs with specific operating models allow users to negotiate the execution price, which might fall outside of the exchanges' best bid and offer prices, to facilitate specialised trading objectives.

11/15 ALPs operators required orders to be crossed at or within the exchanges' best bid and offer prices

*ALP Guidelines*

Most of the ALP operators prepared and published ALP Guidelines which included information such as products traded by the ALPs, hours of operation, eligible users, opt-out arrangement, available order types, order execution and pricing, order priority, order routing mechanism, users customization options, staff with ALP access permissions, risk controls and risk disclosures.

c. Operations of a typical Hong Kong ALP

The following diagram illustrates the operations of a typical ALP with the overall control framework and key controls.
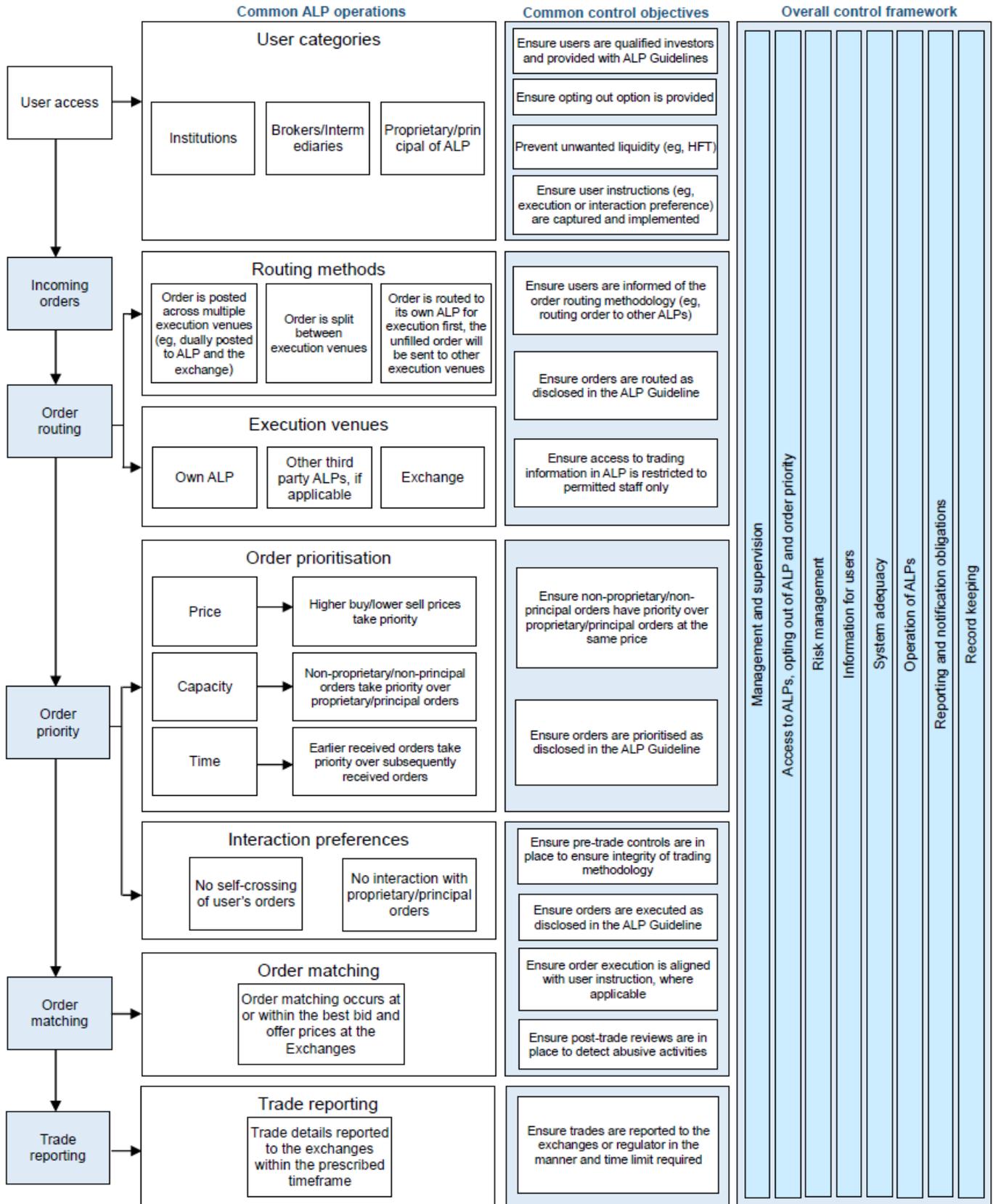
2. Users of ALPs

a. User profiles

Paragraph 19.4 of the Code of Conduct requires that only qualified investors are permitted to be users of an ALP. Most of the ALP operators would perform assessments to ensure users were qualified investors prior to granting user access to ALPs. As many ALP operators in Hong Kong were part of global financial groups, users of ALPs might have been on-boarded overseas. Nevertheless, ALP operators in Hong Kong would perform additional assessments to ensure these users were qualified investors before allowing them access to ALPs.

Generally, users of ALPs could be classified into the following categories:

- Institutional Investors   eg, asset managers or hedge fund clients

- Brokers/Intermediaries   eg, LCs which routed orders to ALPs on behalf of their clients

- Proprietary/Principal Trading   eg, proprietary desk or trading in principal capacity of the ALP operator or its affiliates

Based on an analysis of the top 10 users of ALPs in September 2017 as reported by all the active ALP operators, the majority of trades conducted in ALPs in Hong Kong were transacted for institutional investors.

Proportion of trades in ALPs by user type (September 2017)
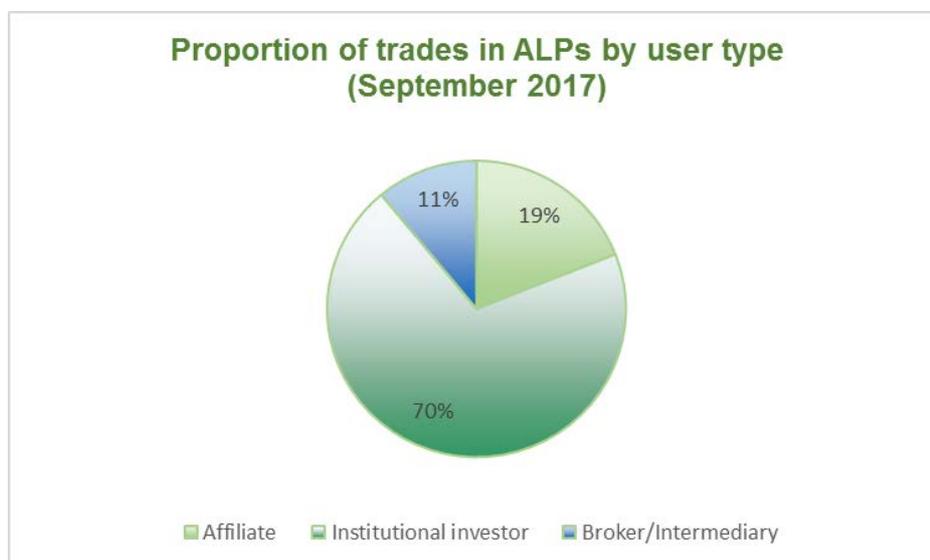
Of the 15 ALPs, 12 allowed brokers and intermediaries to route orders to the ALPs on behalf of their clients. These brokers and intermediaries were required to provide attestations to confirm that the orders were routed to ALPs on behalf of qualified investors, and would provide information concerning client identity upon request.

12/15 ALP operators allowed brokers/intermediaries to route users' orders to their ALPs

Some ALPs allowed proprietary and principal order flows to be routed to their ALPs. These ALPs implemented controls to ensure non-proprietary and non-principal orders took priority over proprietary and principal orders, and they also provided options to allow users to opt out from interacting with proprietary and principal flows.

6/15 ALP operators routed proprietary/principal orders to their ALPs and prioritised non-proprietary/non-principal orders over proprietary/principal orders

Many ALP operators prohibited high frequency traders from accessing their ALPs.

10/15 ALP operators represented that they did not accept high frequency traders or that high frequency trading was prevented from taking place in their ALPs

b. User preferences and customisation

Many ALP operators provided preference and customisation options for users not to trade in their ALPs against certain type of users such as brokers, intermediaries and proprietary and principal users. Moreover, some ALP operators also provided other crossing options, such as not beyond day high or day low, at midpoint or better only, and not with the same legal entity as the user or its affiliates.

11/15 ALP operators provided preference and customisation options for users who did not want to interact with specific users in the ALPs

3. Order routing

The diagram below illustrates a typical order routing mechanism of an ALP:

Non-proprietary/non-principal or proprietary/principal orders

9/15 of ALP operators allowed sending orders directly to ALPs

Algo Engine

The smart order router (SOR) determines how and where orders are routed for execution, based on pre-set trading logics

Smart order router

Own ALP   **Exchange**   **Other third party ALPs**
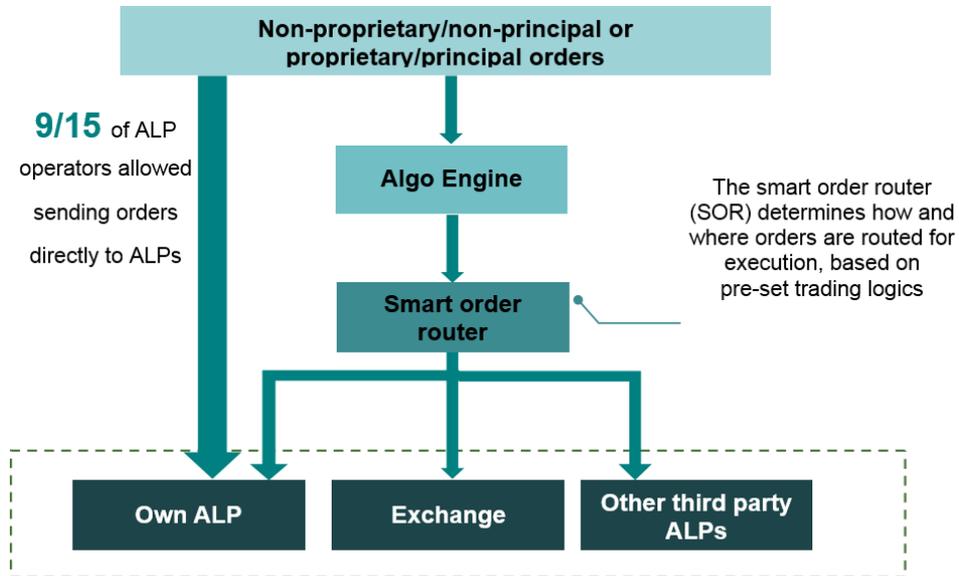
Typically, there were three ways of routing orders to ALPs and the exchanges.

a. Posting of orders to both ALP and the exchange;
b. Splitting order between execution venues; and
c. Routing of orders to ALPs before routing to other execution venues (eg, third-party ALPs).

a. *Posting of order to both ALP and the exchange*

Some ALPs would post the same order to both the ALP and the exchange. In other words, where orders were resting in ALPs, they were simultaneously posted to the exchange to seek more crossing opportunities.

8/15 ALPs posted orders to both ALP and the exchange
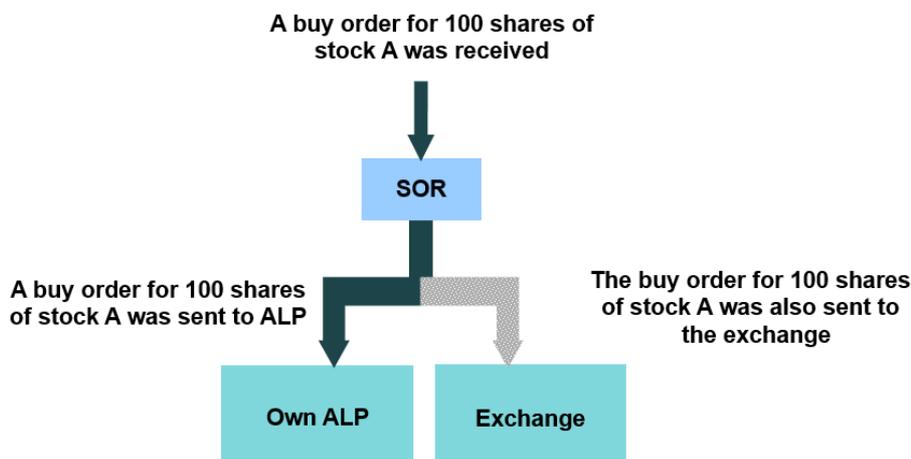
A buy order for 100 shares of stock A was received

SOR

A buy order for 100 shares of stock A was sent to ALP

The buy order for 100 shares of stock A was also sent to the exchange

Own ALP   **Exchange**

Once a crossing opportunity was available in the ALP, the resting order in the ALP was temporarily locked from execution and a cancellation or amendment of order request was sent to the exchange to prevent over-execution. The resting order in the ALPs was only unlocked for matching when acknowledgement of order cancellation or amendment was received from the exchange.

b. Order split between execution venues

Another commonly used order routing mechanism was to split an order between different execution venues. An order could be split in such a way where a portion was sent to the ALP, and the remaining portion was sent to either the exchange or a third-party ALP. The portion to be sent to different execution venues was pre-set in the smart order router.

A number of ALPs also routed orders to ALPs operated by third-party ALP operators. This may add additional operational complexities where their ALPs have different features from the third-party ALPs.

7/15 ALPs routed orders to third-party ALPs

A buy order for 100 shares of stock A was received

SOR

The buy order for 60 shares of stock A was sent to the ALP

The buy order for 40 shares of stock A was sent to the exchange or third-party ALPs

Own ALP

Exchange/ third-party ALPs
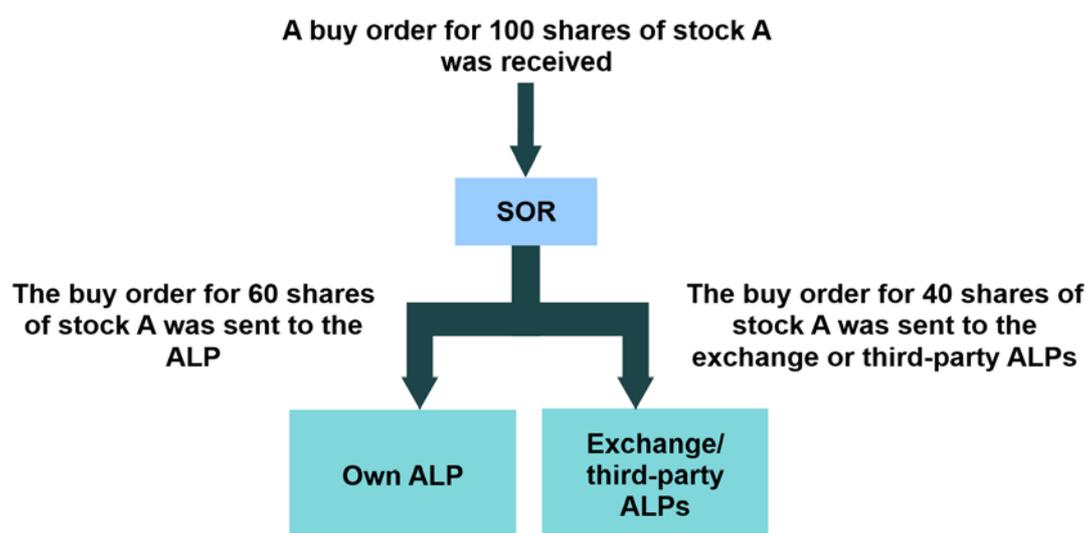
c. Orders routed to ALP prior to other execution venues

Some ALP operators sent orders to their own ALPs first to check for liquidity, then the orders were sent to the exchanges or other third party ALPs when no crossing opportunities were available. If there was liquidity in the ALP but it was insufficient to fill the whole order, the liquidity available in the ALP would be filled first and the remaining unfilled order would then be sent to other execution venues including the exchanges or third-party ALPs.

10/15 ALPs routed orders to their own ALPs first before routing to other execution venues

A buy order for 100 shares of
stock A was received

SOR

A buy order for 100 shares of
stock A was sent to its own
ALP first

Own ALP

70 shares of stock A was executed in
its own ALP

A buy order for the remaining 30 shares
of stock A was sent to exchange or
third-party ALPs

Exchange /
Third-party
ALPs
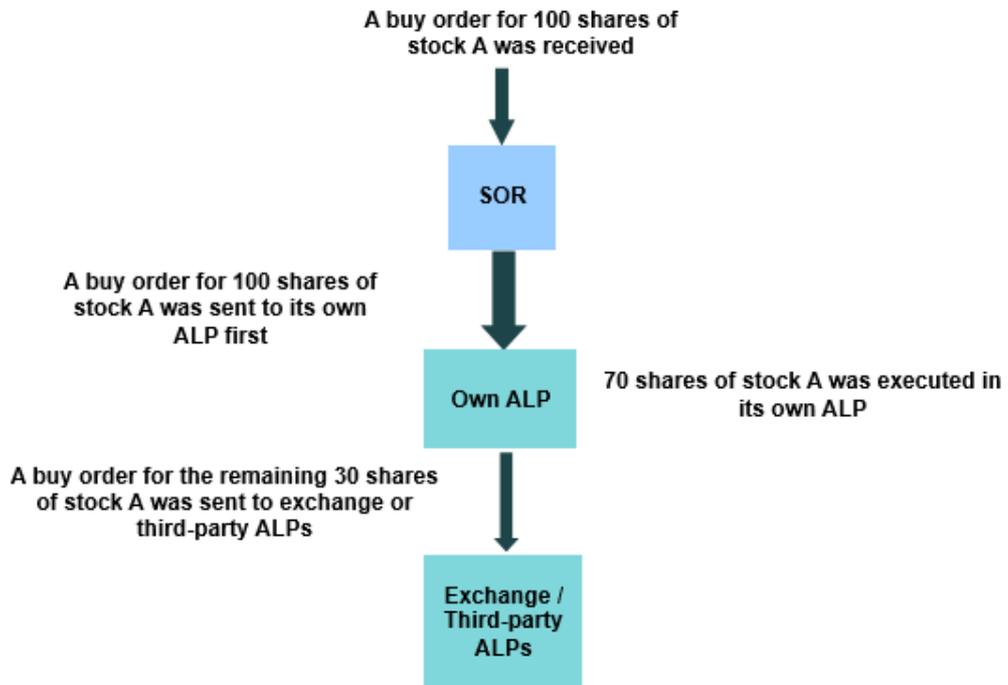
4. Risk management

a. Pre-trade controls

Common pre-trade controls implemented by ALPs included, but were not limited to:

- Price control – prevent crossing of orders outside of the exchanges' best bid and offer prices

- Short sell control – prevent crossing of short sell orders

- Suspended securities control – prevent crossing of suspended securities

- Odd lot control – prevent crossing of odd lot orders

- Matching hour control – prevent crossing outside of ALP operating hours

- Minimum Execution Quantity – prevent crossing of orders in small quantities

Many ALPs had minimum execution quantity ("MEQ") controls available to prevent matching of small-sized orders, thereby reducing the potential for aggressive users engaging in gaming activities to identify liquidity and gain an unfair advantage.
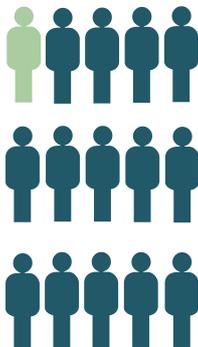
14/15 ALP operators provided the minimum execution quantity ("MEQ") option

b. Post-trade controls

All ALP operators implemented typical post-trade surveillance such as reviews to identify late reporting of ALP transactions to the exchanges and execution price outside of the market's best bid and offer prices at the market.

On top of the typical post-trade surveillance, some ALP operators also performed post-trade analysis to detect aggressive or gaming behaviour. Users consistently demonstrating aggressive or predatory trading behaviour would be blocked from accessing the ALPs.

The following are some examples of post-trade analysis to identify potential gaming behaviour in the ALPs:

- Review possible pinging – to identify users who send small orders to gauge the level of liquidity within the ALP

- Review price reversion – to identify if users may have gained an unfair advantage where there is an abnormal stock price movement after crossing in the ALP

- Review trade-to-order and cancellation ratios – to identify potential gaming by sending non-genuine orders

- Review order resting duration – to identify potential gaming by sending non-genuine orders which typically have a very short resting duration and will be cancelled in a short period of time

Furthermore, some ALP operators provided ALP transaction reports to users. These usually detailed the performance of the ALP with an analysis of execution on behalf of the user in the ALP and other venues, the percentage of orders crossed in the ALP and the proportion of trades executed at the mid-price or near/far end of the bid-ask spread, among other factors.

C. Findings and good practices

5. Management and supervision

Paragraph 3(b) of Schedule 8 of the Code of Conduct requires LCs to establish and implement written internal policies and procedures concerning the design, development, deployment and operation of its ALP to ensure that there is a formalised governance process, with input from risk and compliance functions.

Findings

We observed the following practices which deviated from our expected standards:

i. Most ALP operators established formalised governance committees, which mainly consisted of the following key members, to manage and supervise the design, development, deployment and operation of their ALPs:
   a) responsible officers;
   b) electronic trading team members;
   c) members from independent control functions; and
   d) representatives from IT.

   Nonetheless, we noted instances where compliance functions were insufficiently involved in governance processes.

ii. Further, we noted from our sample review that despite having governance procedures in place, some ALP-related incidents were not escalated to the ALP governance committee.

Good practices

Most of the ALP operators had established governance committees for the overall management and supervision of their ALPs. These committees included members from functions such as sales, trading, risk, compliance, technology and operations.

The governance committees were responsible for overseeing multiple aspects of the ALPs, including their design, development, deployment and operation, as well as the following:
- *Reviewing performance (eg, reviewing crossing results and execution analysis);*
- *Reviewing policy and controls (eg, user on-boarding procedures and changes to their ALP Guidelines); and*
- *Reviewing users' trading behaviour (eg, analysis of potential gaming behaviour).*

6. Access to ALPs

Paragraph 8(a) of Schedule 8 and Paragraph 19.4(a) of the Code of Conduct require LCs to have in place measures which ensure users of ALPs are qualified investors.

Finding

We observed the following practice which is non-compliant with the Code of Conduct:

i.   Most ALP operators had implemented controls to ensure users of ALPs were qualified investors. For users who were already on-boarded to ALPs operated by overseas affiliates, additional assessments were performed by the ALP operators in Hong Kong to ensure they were qualified investors before granting them access to the ALPs in Hong Kong. However, in one case we observed that an ALP operator did not have any measures in place to perform the necessary assessment to ensure users were qualified investors before permitting them access to the ALP. We also noted from our sample review that the ALP operator failed to provide supporting information to demonstrate that the sampled ALP user was a qualified investor.

Good practices

Certain ALP operators implemented a wide range of effective processes and controls for users' access to ALPs, including but not limited to a regular review to verify:
- *whether all users were qualified investors;*
- *the opt-in and opt-out status of users;*
- *users' customisation and preferences were properly set up within relevant systems in accordance with instructions; and*
- *users' customisation and preferences against execution outcomes.*

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7. Order visibility

Paragraph 16(a) of Schedule 8 of the Code of Conduct requires LCs to only permit members of its staff to have access to trading information concerning orders placed, or transactions conducted, in its ALP and only to the extent necessary to enable the ALP to operate satisfactorily and efficiently.

Paragraph 16(b) of Schedule 8 of the Code of Conduct also requires LCs to maintain adequate access logs that record the identity and role of the staff members who have access to their ALPs, the information that has been accessed, the time of access, any approval given for such access and the basis upon which such access was permitted in each case.

Findings

We observed the following practices which are non-compliant with the Code of Conduct:

i.   In general, ALP operators had implemented information security controls to restrict access to and the visibility of trading information for orders placed or transactions conducted in the ALPs. However, we noticed that an ALP operator did not always apply these information security controls to conduit systems such as the order management system or electronic trading monitoring system, which could directly or indirectly allow visibility of trading information in the ALP.

For example, trading information such as (i) resting orders in the ALP or (ii) the algorithmic trading strategy used to execute orders only in the ALP, was shown on the

order management system to which the entire trading desk was granted real-time visibility to gauge the liquidity in the ALP.

ii. We noted from our sample review that some ALPs' access logs only recorded details of staff login and logout times, but other important details such as the information that has been accessed or actions taken were not included.

iii. Furthermore, we noted an instance where an ALP operator only maintained an access log for its order management system and not an access log for the ALP. The ALP operator was under the impression that an access log for the order management system would be sufficient as staff had to login to the order management system prior to accessing the ALP.

iv. Most of the ALP operators only maintained access logs for ALPs without regularly reviewing them to identify any abnormal access or unexpected trading activities.

Good practices

Certain ALP operators had implemented effective controls to restrict access to and the visibility of trading information in ALPs. For instance, access to the trading information was only granted on a need-to-know basis and information security controls were in place with established authentication requirements to prevent unauthorised access.

To avoid inadvertent leakage of trading information, order information such as resting orders, which could be used to gauge liquidity, was not displayed directly or indirectly in the ALP or any other system. When it was necessary for other staff members to monitor the efficient operations of the ALP, both logical controls (eg, approval was required for granting system access to the ALP) and physical controls (eg, physical segregation was in place between the authorised staff members and others) were implemented.

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Also, certain ALP operators maintained ALP access logs not only to record access (eg, name of staff, login time, and logout time), but also to record activities subsequent to the login. Access logs were also reviewed on a regular basis to identify potential anomalies.

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8. Order priority

Paragraph 19.6 of the Code of Conduct states that irrespective of the time when orders are placed, LCs should ensure that the orders of users which are not proprietary orders have priority over proprietary orders when such orders are being transacted at the same price.

Findings

We observed the following practices which deviated from our expected standards:

i. It was a common practice for ALPs to post orders to both the ALP and the exchange simultaneously for more crossing opportunities. The order was resting in the ALP and at the same time queuing in the exchange.

Once a crossing opportunity was available in the ALP, the resting order in the ALP was temporarily locked from execution. Then a cancellation or amendment of order request was sent to the exchange to prevent over-execution. The resting order in the ALP was only unlocked for matching when an acknowledgement of order cancellation or amendment was received from the exchange.

In some situations, the order priority in the ALP which posted orders to both the ALP and the exchange may not be preserved. For example, an order A to buy 100 shares of stock C is resting in the ALP and the same order is posted to the exchange. Where there is a crossing opportunity in the ALP, order A would be temporarily locked from matching in the ALP. At that moment, if there is an incoming order B to buy 100 shares of stock C in the ALP while order A has been locked, order B might take priority over order A to proceed to execution.

However, we noted from our sample review of ALP Guidelines that the following important information was not included.

a) Orders could be posted to both the ALP and the exchange; and
b) The order posting feature and associated order prioritisation in the ALPs.

ALP operators should provide users with sufficient information in their ALP Guidelines which includes, but is not limited to, details of the order posting feature (eg, orders would be routed to the exchange while simultaneously kept available for trading in the ALP) and the associated order prioritisation. Additionally, ALP operators should design and perform specific testing scenarios to ensure their ALPs operate as disclosed in their ALP Guidelines (eg, perform testing on order routing to different execution venues and associated order prioritisation).

ii. We also noted instances where orders originated by non-proprietary and non-principal users and those originated by proprietary and principal users were not properly differentiated. As a consequence, some proprietary and principal orders were wrongly tagged as non-proprietary orders for crossing in the ALPs.

iii. The most commonly used order prioritisation was first price, then capacity (ie, non-proprietary/non-principal vs proprietary/principal) and finally time.

However, a few ALPs employed different order prioritisation. For example, orders were prioritised based on the size of the liquidity provided, or executed trades were allocated to users in proportion to the size of the order placed, regardless of the time.

Notwithstanding which order prioritisation ALPs adopt, we would like to remind ALP operators of the requirements stipulated in paragraph 19 and schedule 8 of the Code of Conduct as well as all other applicable regulatory requirements such as paragraph 9.1 of the Code of Conduct whereby clients' orders should be handled fairly and in the order they are received.

Good practices

Several ALP operators had implemented effective controls to verify the accuracy of the tagging of non-proprietary and non-principal trading accounts and proprietary and principal trading accounts when these trading accounts were set up and on a regular basis thereafter.

Additionally, these ALP operators conducted regular reviews to check if tagging was correctly implemented. Further, certain ALP operators had implemented system controls to automatically detect any instances where non-proprietary or non-principal orders were not given priority over proprietary and principal orders.

9. ALP Guidelines

Paragraphs 19.7(a) and (b) of the Code of Conduct require LCs, by means of ALP Guidelines, to provide sufficiently comprehensive information to the users of the ALP to ensure that they are fully informed as to the manner in which the ALP operates, and prior to routing any order to an ALP on behalf of a client for the first time, bring the ALP Guidelines to the attention of the person placing or originating the order.

Paragraph 19.8 of the Code of Conduct also requires LCs to permit users to opt out of matching or crossing their orders in their ALPs.

Findings

We observed the following practices which are non-compliant with the Code of Conduct:

i. All ALP operators had published their ALP Guidelines on their websites, but the comprehensiveness of the information varied. We noted from our sample review that some important details such as opt-out arrangements were not included in their ALP Guidelines.

ii. Furthermore, we noted an instance whereby an ALP operator adopted an opt-out arrangement to on-board users. However, a group of users was enabled in the ALP even though they had never been provided with the opt-out options nor with the ALP Guidelines informing them that their orders would be routed to the ALP.

Further, we observed the following practices which deviated from our expected standards:

iii. A number of ALPs routed orders to ALPs operated by other third-party ALP operators. Because ALPs have different operations and features (eg, routing and execution mechanisms), ALP operators are expected to bring both their own ALP Guidelines and third party ALP Guidelines to the attention of users. Users should also be provided with the opt-out options from these third-party ALPs.

However, we noted some instances where the ALP Guidelines did not include the following information:
a) Orders would be routed to other third-party ALPs; and
b) Options for opting out from the third-party ALPs.

Furthermore, we noted in most cases that third-party ALP Guidelines had not been brought to the attention of users who placed or originated the orders.

ALP operators which route orders to third-party ALPs should disclose this in their ALP Guidelines along with the opt-out options for the third-party ALPs. These ALP operators should bring their own ALP Guidelines as well as the third-party ALP Guidelines to the

attention of users to ensure they are fully informed as to the manner in which the third-party ALPs operate.

> *Good practices*
>
> *Some ALPs implemented system controls to grant user access to ALPs only when evidence demonstrating that their ALP Guidelines had been provided to users was recorded in the system.*

10. Risk management

> *Paragraph 19.11 of the Code of Conduct requires LCs to have controls that are reasonably designed to ensure the integrity of the ALP trading methodology; and that the ALP trading methodology operates in the interest of preserving the integrity of the market.*
>
> *Paragraph 24 of Schedule 8 of the Code of Conduct requires LCs to regularly conduct post-trade reviews of transactions conducted in its ALP to identify any:*
> *a) suspicious market manipulative or abusive activities;*
> *b) market events or system deficiencies, such as unintended impact on the market, which call for further risk control measures; and*
> *c) breaches, whether actual or potential, of any requirements relating to fair and orderly trading in its ALP or which might constitute market misconduct.*

Findings

We observed the following practices which deviated from our expected standards:

i. By and large, ALP operators conducted post-trade reviews of transactions executed in ALPs. Typical post-trade reviews covered potential insider trading and execution price outside the best bid-offer, among others. However, only a few ALP operators implemented post-trade reviews specifically to identify potentially abusive activities, such as gaming activities.

ii. The analysis and justification of the appropriateness of the criteria and thresholds used for the post-trade reviews were not documented, nor were they subject to periodic review.

> *Good practices*
>
> *Some ALP operators implemented comprehensive post-trade reviews of transactions conducted in the ALPs, including post-trade reviews to identify any potential gaming behaviour in the ALPs, such as reviewing for possible pinging (ie, trading behaviour where a small order is followed by a much larger order in a short period of time), or reviewing metrics such as order-to-trade ratios, order resting times or price movements after execution in the ALP.*
>
> *Further, some ALP operators periodically analysed users' trading behaviour to identify users who exhibited potential gaming behaviour. Metrics under review included (i) order resting times, (ii) order-to trade-ratios, and (iii) price movements after crossing. Cases where users were identified with gaming behaviour would be escalated to the*

governance committee to consider whether their access to the ALP needed to be revoked.

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Some ALP operators performed risk assessments of their ALP operations and the corresponding controls to ensure proper mitigations were in place and that clear documentation of the risk assessments was retained. These risk assessments could be used to identify potential gaps in ALP control frameworks.

11. System adequacy

Paragraph 12 of Schedule 8 of the Code of Conduct requires LCs to ensure that their ALPs have effective controls to enable them, where necessary, to immediately prevent transactions from being conducted in the ALP.

Paragraph 13 of Schedule 8 of the Code of Conduct requires LCs to ensure their ALPs, and all modifications to their ALPs, are tested before deployment and are regularly reviewed to ensure that the ALPs and their modifications are reliable.

Paragraph 15(b) of Schedule 8 of the Code of Conduct also requires LCs to ensure that the capacities of their ALPs are regularly stress tested to establish the system behaviour under different simulated market conditions, with the findings of the stress tests and any actions taken to address those findings being documented.

Findings

We observed the following practices which are non-compliant with the Code of Conduct:

i. In relation to the capacity stress testing, we noted the following deficiencies:

- A number of ALP operators did not perform the capacity stress test at all; and
- Although capacity stress tests were performed by a few ALP operators, they were only conducted at the group level without considering the local trading environment and the local Licensed Corporations in Hong Kong were not involved.

Further, we observed the following practices which deviated from our expected standards:

ii. Most of the ALP operators performed tests on modifications of their ALPs before deployment. However, some were unable to demonstrate that their ALPs had been adequately tested as there was no documented rationale of the population of tests performed and why these tests were considered appropriate and sufficient.

iii. We noted an instance where modifications were deployed even though the tests had failed. The ALP operator was unable to provide documentation of the justification or rationale to support the final approval to deploy them.

iv. Separately, we noted that some ALPs' kill switch procedures were not comprehensive as they lacked important details such as (i) the roles and responsibilities of each of the parties involved in approving and triggering the kill switch, and (ii) the criteria and escalation protocols for activating the kill switch.

> *Good practices*
>
> *Several ALP operators established policies and procedures for the change management of ALPs to include details such as the objectives, methodologies, roles and responsibilities of different teams in the process, as well as the types of tests to be performed. There was also proper segregation of duties between conflicting roles such as developers, testing teams, and teams responsible for migrating changes. Additionally, all test cases were performed for every ALP system release and the relevant information such as test cases and test results were properly maintained.*
>
> *****
>
> *A number of ALP operators established written procedures for kill switch activation, detailing the level at which the kill switch can be implemented (eg, at the symbol level, or at the ALP level), as well as the escalation and required approval. Moreover, some ALP operators conducted regular drills of the kill switch procedures.*

12. Contingency

> *Paragraph 17 and 18 of Schedule 8 of the Code of Conduct require LCs to establish a written contingency plan to cope with emergencies and disruptions related to the operation of their ALPs, and the contingency plan is periodically tested to ensure it is viable and adequate.*

Findings

We observed the following practices which are non-compliant with the Code of Conduct:

i. Most of the ALP operators had established comprehensive written contingency plans to cope with emergencies and disruptions related to the operation of ALPs. The contingency plans were tested regularly with involvement from the local business.

    However, we noted a few cases where ALP operators did not establish written contingency plans to cope with emergencies and disruptions arising from the operations of an ALP.

ii. We also noted one instance where the only contingency plan was to shut down the ALP during an emergency, and there were no other arrangements for backup facilities or procedures to deal with users and regulatory enquiries in the event of disruptions.

Further, we observed the following practice which deviated from our expected standards:

iii. We noted that the incident management protocols for ALPs lacked sufficient details about procedures for reporting and escalating incidents.

    ALP operators should implement incident management procedures which include details on handling ALP-related incidents (eg, ALP service interruptions), escalation and notification protocols and requirements to document details of incidents. In particular, requirements to notify users and regulators about ALP-related incidents should also be specified in the procedures. Minimum contents to be included in incident reports should

also be prescribed, including information such as the details and impact of the incident and the rectification measures taken.

13. Other observations

i. Paragraph 27(d) of Schedule 8 of the Code of Conduct requires LCs to provide the SFC with a report recording the volume of trades conducted by each of the 10 largest users of its ALP in each calendar month within 10 business days after the end of the month, or as otherwise requested by the SFC.

However, we noted from our sample review that some ALP operators did not provide the SFC with the trading volume conducted by the 10 largest users originating orders in the ALP.

ii. All ALPs employed market data feed services from third-party providers as a reference for the bid and offer prices at the exchange to determine the execution price in the ALPs.

However, we noted that some ALP operators did not have adequate controls in place to ensure the market data fed into the ALPs was up-to-date. For example, an ALP operator only compared market data against the previous day's closing price to check whether it had been updated.

iii. Third-party service providers were involved in supporting the development and maintenance of ALPs. Where ALPs are provided and supported by third-party service providers, ALP operators are expected to perform due diligence to ensure that these third-party service providers and the ALP systems provided meet the relevant requirements in the Code of Conduct. All modifications to ALPs should be adequately tested before deployment and regularly reviewed to ensure the ALPs and their modifications are reliable.

iv. ALP operations often involved the use of a smart order router (SOR), which determined how and where orders were routed for execution, based on pre-set trading logics. Where an SOR was employed in connection with ALP operations, it was considered as an integral part of the ALP. ALP operators should ensure their ALPs, together with the SORs which are inseparable from the ALP operations, are in compliance with the requirements stipulated in paragraph 19 and schedule 8 of the Code of Conduct. In particular, there should be controls in place to ensure adequate management oversight of the use of SORs. Testing should be performed to ensure the system adequacy of SORs together with the ALPs.

v. Separately, we noted that a few ALP operators adopted unique ALP operating models where the order receiving, routing, prioritisation and matching were different from a typical ALP. For example, they may allow crossing of orders outside the best bid and offer prices of the exchange after negotiation between users, or restrict access to the ALP to specific users with specialised trading objectives.

ALP operators should ensure that sufficiently comprehensive information regarding the manner in which the ALP operates are clearly disclosed in their ALP Guidelines, such that users are fully informed.

We would also like to remind ALP operators that they are expected to comply with all applicable rules and regulations. In particular, they should act in the best interests of their

clients, execute orders on the best available terms and comply with the regulations applicable to ALP operations.