

TRADING SYSTEM - HKATS

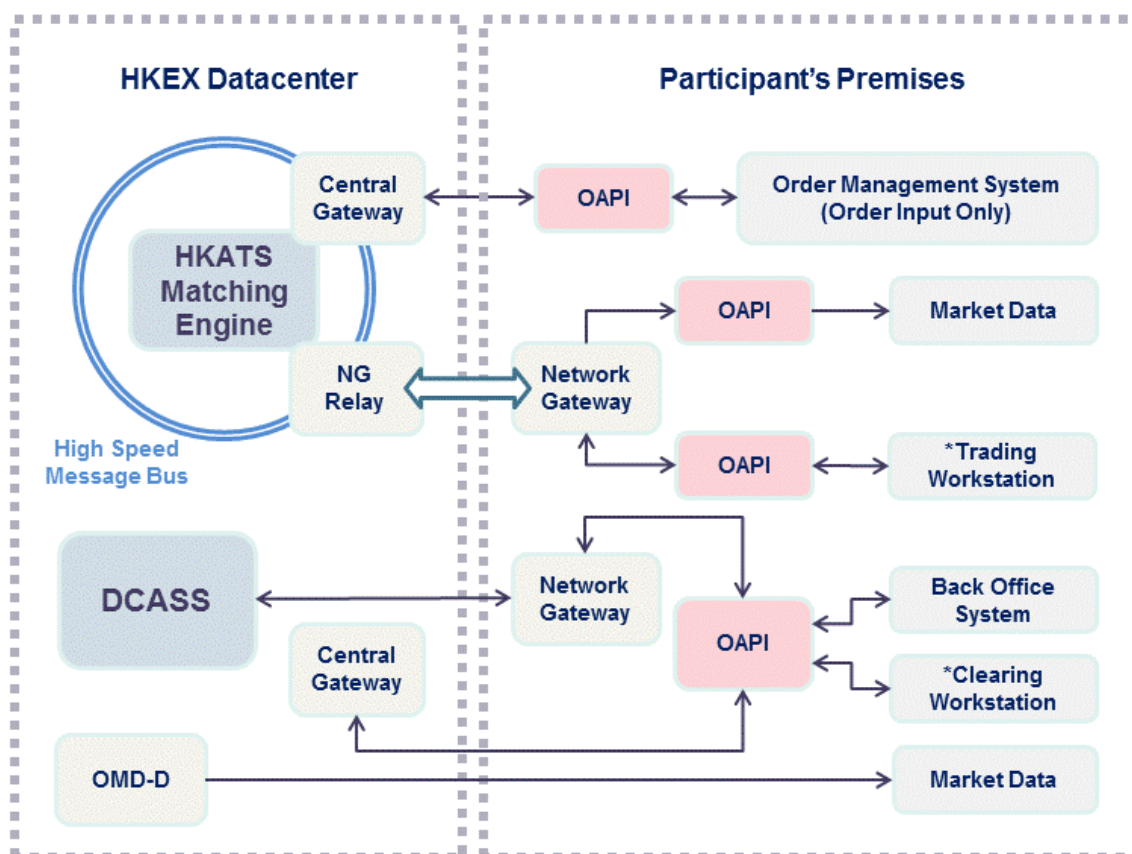
THE HISTORY

The Futures Exchange's first electronic screen-based trading system, the Automated Trading System was introduced in November 1995. In Oct 2013, the trading system, Hong Kong Futures Automatic Trading System (HKATS), for the derivatives market has been upgraded to a new technology platform, Genium INET.

This new technology platform will be able to achieve significant improvement in order capacity, clearing capacity and ultra-low order processing latency to support our further development in the derivatives market, especially in improving the liquidity of the stock options market.

THE SYSTEM

HKATS is a transaction-based network system. Trading on HKATS can be conducted through HKATS Click workstations or independently supplied workstations connected through Omnet Application Programming Interface (OAPI). With HKATS, users can view real-time price information on a computer screen, click on a bid or ask price and execute an order.



ACCESS TO MARKET

Exchange Participants may access HKATS directly through workstations (with an interface program) or an application programming interface (API).

The minimum requirement for each HKATS access connection is one personal computer, two SDNet lines, two routers, a switch, connection cable(s) and the application software. Details of the equipment requirement and estimated set-up costs and running costs which an Exchange Participant is required are described below.

Exchange Participants which want to install more than the maximum number of connections allowed at any location, using multiple APIs per workstation or having trading workstations at different locations will need to acquire additional lines, routers and switches .

CENTRAL GATEWAYS

Participants can directly connect to the HKEX host servers via Central Gateways as the primary access points. These Central Gateways are located on the high speed message bus of the central system and thereby provide significant improvements in transaction latency.

APPLICATION PROGRAMMING INTERFACE (API) APPROACH

The API is the customer interface to HKATS. The interface enables programming of fast and reliable business transactions. All trades are synchronous and sequential, i.e., the API processes only one transaction and process at a time. However, a single transaction may contain many operations, requests or orders, forcing central resources to process different requests concurrently.

Through the use of the API, Exchange Participants can connect their in-house trading front ends, clearing and risk management systems to HKATS.

CLICK WORKSTATION APPROACH

Each CLICK workstation is installed with an interface program, Click Trade, which connects HKATS users through a Network Gateway in Exchange Participant's site to the central marketplace. CLICK Workstation will be available from HKEX for installation as the trading frontend software in the initial rollout of Genium INET Platform but support for the software will ultimately be discontinued, tentatively in 2017.

HOW TO MARKET PARTICIPANTS BENEFIT?

HKATS creates a fair, efficient and accessible market place for all market participants. HKATS equips market participants with comprehensive real-time market information, putting them in a stronger position to capture investment opportunities.

- *Level Playing Field*
All HKATS participants, whether they are retail investors, institutional investors or market makers, trade in one centralised market place. In addition, there are no time and place advantages as all orders are executed electronically based on strict price/time priority.
- *More Efficient Trading*
With HKATS, orders are placed through HKATS workstations at Exchange Participants' offices. The system then automatically matches the orders with corresponding buy or sell orders in real-time based on price/time priority. The trade information is captured and reported back to the Exchange Participants who can confirm the trades with the clients immediately.
- *Lower Costs*
Experience elsewhere has shown that electronic trading leads to lower operating costs for Exchange Participants in the long run, and that often leads to lower transaction costs for their clients.
- *Enhanced Customer Service*
Traders can provide full electronic order routing, straight-through trade processing, internet trading and other value-added services to clients.
- *Flexibility*
One of the great advantages of HKATS is that it can easily accommodate the introduction of new products and extended trading hours.

HKATS Specifications

In order to trade through the new HKATS environment, at least one pair of SDNet/2 lines with modems and routers, one switch/hub, and LAN connection cables are needed. Exchange Participant can choose to connect to HKATS through central gateway and/or network gateway.

The system configuration of CLICK workstation is as follows:

CLICK Workstation ^{Note 1}

Hardware Requirement

1. Intel® Core™ i3-550 3.2 GHz (or higher)
2. 4 GB RAM (or more)
3. Hard disk with at least 10 GB disk space available
4. 8 MB video memory (or more)
5. 21" monitor with 1280 x 1024 resolution (or higher)
6. Ethernet network adapter (supporting 100/1000 Mbps with full duplex)
7. CD/DVD-ROM drive
8. Mouse & US-keyboard
9. Sound blaster & Loud speaker (optional)

Software

1. Microsoft Windows 7 Professional 64-bit (Service Pack 1 or later) (English)
2. Anti-Virus software

^{Note 1} Other comparable configuration may also work, which is subject to further verification. Network gateway is required for CLICK workstation.

Switch (or Equivalent) ^{Note 2}

1. Provide at least eight (see Note 2 below) 10/100/1000 BaseT RJ-45 connections with UTP (Cat 6 cable) to PC, network gateway and SDNet routers at each Exchange Participant's site.
2. Conforms to IEEE 802.3(x) Ethernet standard with capability for 10/100/1000 BaseT auto-negotiation.
3. Can be managed through SNMP.
4. Able to support telnet-based or terminal-based out-of-band management is an advantage.
5. Switch port connecting SDNet routers and network gateway must be configured as 100/1000 Mbps full-duplex mode.

^{Note 2} Exchange Participants should use switches which comply with the above specification and industrial standard. Exchange Participant may consider purchasing additional switches for better redundancy and port capacity when deemed appropriate.

If the switch is connected to Exchange Participant's own internal network, Participants should ensure that network loop will not be created. In addition, Participant should ensure that there is no network address conflict. Three ports will be taken up by the two SDNet routers and the Network Gateway while the remaining ports are for Click Trade and OAPI application connections. If more connections are anticipated, the procured switch should provide more RJ-45 connections.

Since SDNet circuits of different site are using the same HSRP group, Participants are reminded not to connect SDNet circuits of different site on the same layer-2 LAN. If switch will be shared among sites, it should be separated by VLAN.

Two Straight Cat 6 UTP cables

1. Connection between the routers and the switch/hub.
2. The cable standard and wiring must meet the TIA 568-A/UTP Cat 6 standard.
3. The Cat 6 UTP cables should be of sufficient length and comply with the above standard.
4. If the Exchange Participant purchases additional switch, please ensure there are additional cables for cascading the switches.

Power Sockets (13A)

1. Sufficient for 2 routers, 2 modems and 1 (or 2) switch.
2. Sufficient for network gateway and CLICK workstation(s).

Network Gateway ^{Note 3}

1. 2 x six-core Xeon 2.8 GHz compatible or faster processor
2. 12 GB RAM or more
3. 2 x 73 GB of available hard-disk space or more
4. CD-ROM or DVD-ROM drive
5. Ethernet network adapter (10/100/1000 BaseT with auto-negotiation)
6. Red Hat Enterprise Linux 6
7. Symantec AntiVirus ^{Note 4}
8. OMex Genium subsystems

^{Note 3} Fully compatible with the standard of Red Hat Enterprise Linux 6.2 Operating System as indicated in release notes from Red Hat website:
<http://www.redhat.com> .

^{Note 4} Software maintenance is required in order to obtain version/release upgrade. Please see next section for the estimated cost.

Details of estimated set up costs and running costs of HKATS with network gateway and one CLICK workstation are estimated as follows (Note 5):

	HKD	First Gateway	Other Gateways
INITIAL COST			
Hardware			
Gateway Node with installation for Genium	65,000	✓	✓
Switch	8,000	✓	✓
CLICK Workstation with Microsoft Windows 7 Professional (Service Pack 1 or later) pre-installed	25,000	✓	✓
Cable	200	✓	✓
Subtotal		98,200	98,200
Software			
Red Hat Enterprise Linux 2 Sockets 1 Guest 1 Year Subscription	64,000	✓	✓
Symantec AntiVirus	360	✓	✓
Subtotal		64,360	64,360
Installation			
Gateway	8,500		✓
Gateway Software	3,000	✓	✓
Subtotal		3,000	11,500
Total Initial Cost		165,560	174,060

MONTHLY FEE			
SDNet 2x10M Circuits with routers	7,000	✓	✓
CLICK or OAPI Sub-licence Fee	1,750	✓	✓
Monthly Recurring Cost	3,000		✓
Total Monthly Fee		8,750	11,750
ANNUAL MAINTENANCE			
Gateway hardware	24,000	✓	✓
Switch	1,300	✓	✓
Software maintenance fee for: Symantec AntiVirus	600	✓	✓
Total Annual Maintenance Fee		25,900	25,900

Note 5: Exchange Participant (EP) who desires to install more than the allowed maximum number of CLICK workstations at any location, or who are using multiple APIs per workstation, or who decides to have trading workstations located at different locations will need to acquire additional sets of SDNet lines with routers and modems, switch and network gateway.

Note 6: EP is responsible for maintenance renewal for Gateway hardware & software and Switch purchased and owned by EP.

Details of estimated set up costs and running costs of HKATS with one OAPI connection with throughput of 5 transactions per second to central gateway are estimated as follows:

	HKD	Total
INITIAL COST		
Hardware ^{Note 7}		
Switch	8,000	✓
OAPI Workstation	25,000	✓
Cable	200	✓
Total Initial Cost		33,200
MONTHLY FEE		
SDNet 2x4M Circuits with routers	5,800	✓
OAPI Sub-licence Fee (\$2,600 per connection, waived for the first 2 connections)	0	✓
Total Monthly Fee		5,800
ANNUAL MAINTENANCE		
Switch	1,300	✓
Total Annual Maintenance Fee		1,300

Note 7: Cost on OAPI software is not shown in the above table.