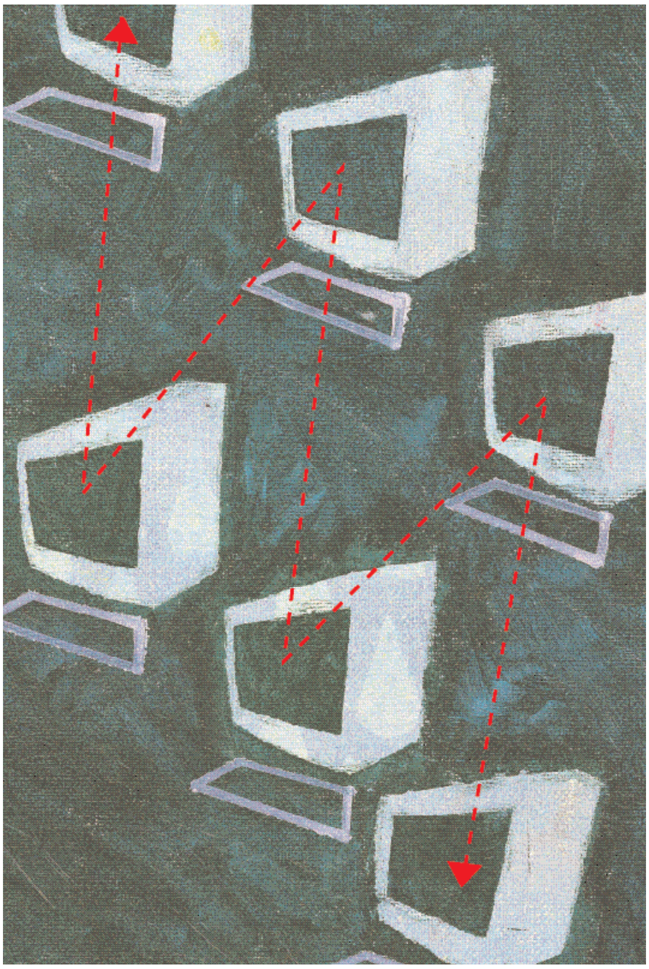

DBS Vickers Online develops automated trading system to Singapore Exchange utilising FIX protocol

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Following the successful automation of trading system connections to the Hong Kong Exchange in 2000 and US/Canada in 2001, DBS Vickers Online [DBSVO] looked to improve its online systems in the Asia market by consolidating and automating its market trading system to multiple exchanges in the region.

Prior to 2000 / 2001, DBSVO was manually executing and processing orders for both the Hong Kong and US / Canadian markets and had explored a FIX-compatible trading gateway in order to improve the flexibility and scalability in its order routing management. Drawing on this past experience, DBSVO believed that utilising the Financial Information Exchange [FIX] protocol to connect to the Singapore Exchange would result in immediate benefits. Singapore trading capabilities would be added into the order management system – as well as integrating trading functions of Singapore's securities market with its trading terminals deployed in both Hong Kong and Singapore. This would allow real-time Singapore market quotes to be added to the existing analysis modules of the trading systems. The improved system offers greater flexibility / systems enhancement with quick deployment of FIX-enabled financial instruments for enhanced market opportunities. The major financial institutions adopting SGXAccess and to be considered included, CLSA Singapore, ING Barings Securities (Singapore), Merrill Lynch (Singapore), Morgan Stanley Dean Witter Asia (S) Securities, Nomura Securities Singapore and, HSBC Securities (Singapore).

Background on DBS Vickers Online

DBS Vickers Online [formerly named DBS TD Waterhouse] is a joint venture by DBS Vickers and TD Waterhouse Group to form the global online financial services company. This joint venture was formed in 2002 to bring together TD Waterhouse's technology and its track record in online brokerage with DBS' strong regional franchise and distribution network in Asia. DBS Vickers Online provides trade connections to stock markets in Singapore, Hong Kong, the United States and Canada as well as UK and B-shares listed on the Shanghai and Shenzhen Markets.

Implications of FIX for DBS Vickers Online

The open interface FIX protocol standard will enable DBSVO to provide trading order execution channels for both buy side and sell side to establish a regional security execution hub for STP orders to international financial institutions and other networks such as Bloomberg, Reuters and GL Net.

The challenge

Operating two online trading platforms in Singapore for connection to the Singapore Exchange via a serial interface presented a number of challenges for DBSVO. Speed was a big issue for its online customers, with the serial interface presenting a number of limitations. Each serial interface terminal with transient data or maps of transaction records limited the scalability of the systems. Recovery of transactions was also a problem and time consuming when it came to manually fixing-up transactions one by one during fail-over or service interruption.

The FIX protocol is presented as an open standard with wide support; the specification is both comprehensive and versatile for supporting current business requirements and technology complexities within the financial industry. Considering the large number of financial institutions supporting the FIX trading gateway, the ability to trade via FIX with speed and reliability would provide a great advantage for DBSVO. As Singapore was just one of the many markets DBSVO offered, it could not operate multiple terminals for multiple trading platforms. By consolidating multiple online trading platforms into the ONE trading platform, DBSVO's dealing desk would become consolidated with the ONE view of its client portfolios. The FIX-enabled ONE-online trading platform would also provide its Hong Kong and Singapore office's back-up for customer enquiries and order placements with multiple markets having front office functions, as well as supporting back office functions across countries. This would also enable DBSVO to provide regional services to its customers where applicable.

Maintenance of any multiple online trading systems also posed a major problem for DBSVO. Cost of implementing and supporting Internet equipment such as firewalls, switches and routers was duplicated in multiple data centres. Cost of licensing web data and contents was also replicated.

Trading system consolidation strategy

In 2002 DBSVO developed a strategy for consolidating its multiple trading platforms. At that time, DBSVO was operating three online trading platforms. Of these, two traded the Singapore market in Singapore. One was decommissioned in 2002 with its customers migrating to the alternate platform seamlessly.

Prior to deployment of SGXAccess, DBSVO was still experiencing limitations with the serial interface of the Singapore Exchange market. DBSVO continued to manage the Singapore domicile accounts using the remaining one platform and the Hong Kong domicile accounts by the secondary platform. Market offering for customers was limited to the country specific platform.

During 2003, DBSVO deployed the ONE trading platform to support both Singapore and Hong Kong domicile accounts by integrating Singapore's security market via SGXAccess. The ONE trading platform now supports all front office, middle office and back office functions in addition to multiple channel supports. The ONE platform – forming a consolidated system, provided faster and, more reliable access to the market for order executions in the Singapore, NYSE, AMEX, NASDAQ, Hong Kong, UK and China B share markets. It has also resulted in lowering operational costs as well as system maintenance costs, and improved the resilience of support across countries at the same time. According to Brian Kei, "the consolidation of trading platforms and adoption of the FIX protocol for the trading system has allowed DBSVO to turn the corner and improve services to our customers including order execution performance and the convenience of global investment for both Hong Kong and Singapore customers."

Automated systems development for DBS Vickers Online

In 2002 DBSVO selected Hong Kong-based IT firm Infocast to provide the automated trading solution to the Singapore Exchange market that would fully integrate the back and front office with a FIX-based order management system.

When scoping systems development for standardising order flow exchange with external parties, a number of initial hurdles presented early on including customisation considerations for conforming to the Singapore Exchange's regulatory requirements. SGXAccess deployment by the Singapore Exchange allows financial institutions to deploy trading terminals outside Singapore. This was critical to DBSVO's regional deployment and integration of trading systems. The design of the network architecture required best throughput for the order management systems. Other major obstacles were risk management rules and reporting requirements from the Monetary Authority of Singapore [MAS]. These trading and settlement rules varied significantly to those in Hong Kong therefore leading to increased risk and complexity for the integrated order management system covering both HK, SGX and possibly the US.

There was also other project considerations from the outset. Time to market was very important for clients of the DBSVO FIX automated system project. The lull in the Asia market provided a greater period for scoping the capability of the order management system with the newly integrated FIX protocol, which lead to a decision to develop an entirely new OMS. To be completed within five months to meet DBSVO's client tight time-to-market schedule, it was important to look at the FIX connectivity risks and basically put a system development process in place that would minimise these risks particularly as the FIX business rules were more challenging than the rules and regulatory requirements we were currently dealing with.

"FIX emerged as an important focus for its connectivity role with external parties, both Buy and Sell side," said Brian Kei. "It was clear that this was important despite the extra effort to provide the proprietary interface. Total cost of ownership was too great to consider for counterparty connectivity. At any rate DBSVO realised FIX was THE standard to talk externally."

A number of FIX engines were evaluated for the project including CameronFIX, which appeared could "talk" the heavily customised dialect of the Singapore Exchange. Its core architecture looked to have a unified, clean interface with well-written documentation, which was a big plus for new users.

"We were quite impressed that members of the development team, with little FIX experience were able to play with the Cameron API and manage to extend its default behavior down to the message and field level," said Infocast's CTO, Sonny Crisini. "We were able to extend the default persistence behaviour to reflect our own technical requirements. The message handling architecture was a major consideration. The flexibility of the core services provided, including the core library and a persistence model to meet our requirements, was important. Support was also critical as we didn't want to be left hanging in the event of error."

The Singapore Exchange required a heavily customised FIX implementation; the complexity of customisation to SGX included Admin Messages and Trade Types that included user defined fields that, for a FIX novice, would take time.

The requirements for Singapore Exchange FIX DMA:

- SGX dialect needed to be separated from the core Buy-side FIX engine server.
- A FIX Adapter was required for making the FIX Connectivity "best fit" with the system architecture.
- FIX connectivity requirements were gathering momentum in Asia and therefore it would be advantageous to further develop a FIX Interface on both the Sell-side and Buy-side of the order management system.
- FIX connectivity certification with Singapore Exchange was required.

The Singapore Exchange' certification requirements took approximately two weeks. The systems development team was able to follow the sample programme from the FIX vendor and pass the test relatively quickly. The FIX message connection testing also had a good result with minimal configuration issues.

With demand for FIX connectivity steadily increasing, a second automation project for DBSVO was scheduled to develop a sell-side FIX interface to meet the ongoing growth in multi-market connectivity from external brokers, specifically international institutional buy-side firms. Means to rationalise broker-to-broker connectivity was decided in early 2004, and with that the decision to utilise FIX as the external interface for counterparty connectivity.

With the sell-side solution due for completion by Q4 of 2004, DBSVO will be able to handle multiple counterparty buy-side, requiring different FIX versions and different handlers. The new system has been devised to include functionality for handling varied risk management rules for different counterparties. **FIX**