



NAEF Conference 2011

How alternative trading systems impact the liquidity landscape and creates winners and losers.

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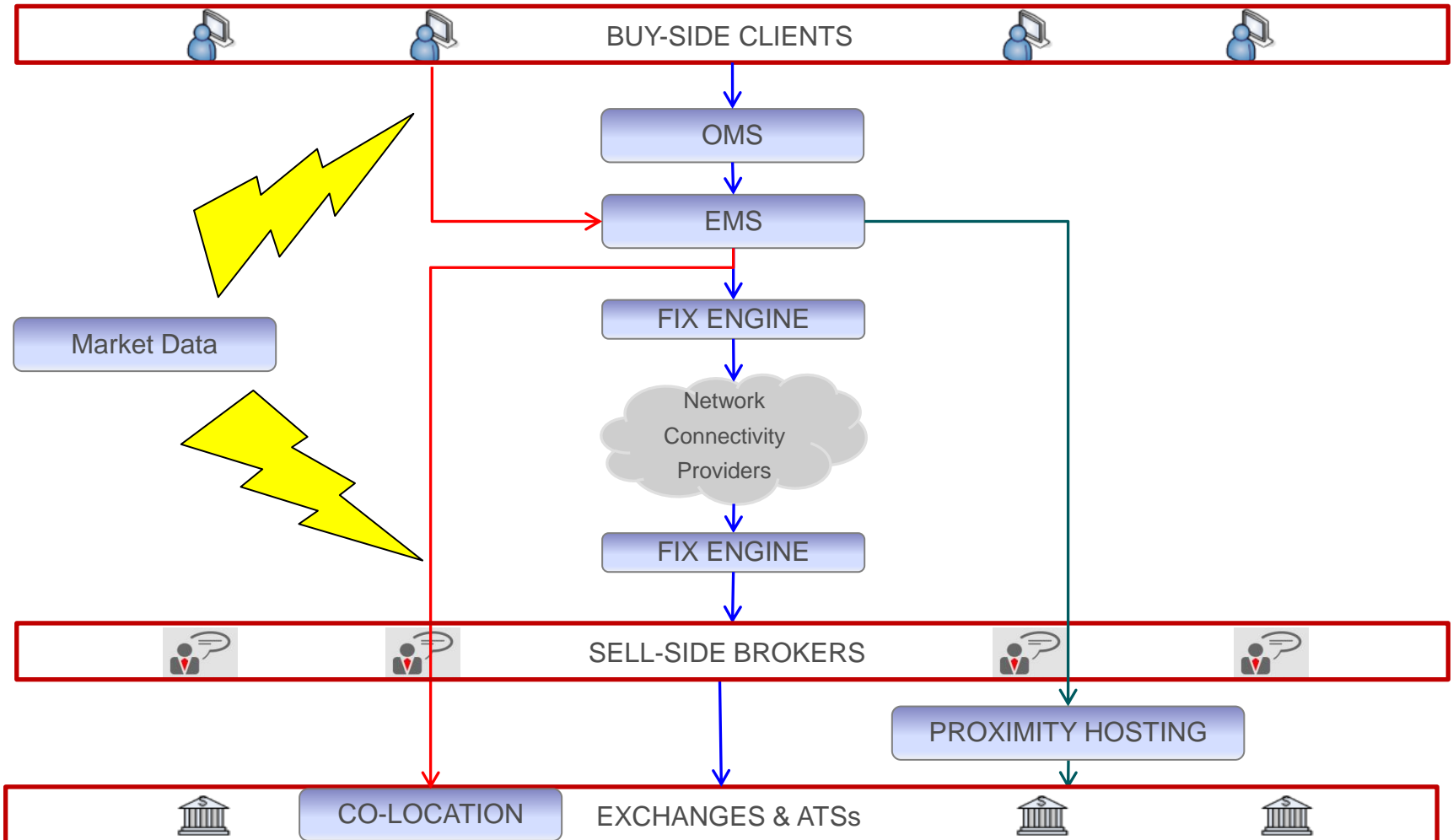
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Electronic Trading Flow

Birds eye view of the electronic flow and the parties involved



Market Data Providers

Market data is numerical price data, reported from trading venues, associated with equity, fixed-income, financial derivatives, currency and other investment instruments.

Market Data Provision Services

- **Provision of real-time market data:** low latency is the key for real-time data as delivery of price quotations from exchanges to users is highly time sensitive.
- **Provision of static or reference data:** reference data from the issuer includes end-of-day pricing, terms of security (e.g. interest rates and maturity on a bond), outstanding corporate actions (e.g. pending stock splits) and identifier codes.
- **Data filtering and management:** the complexity of managing market data has risen with the increasing numbers of issued securities, continuing evolution of derivatives/indices and the globalization of capital markets. This calls for the need to filter data, extracting only the necessary market data and freeing up CPU space for trading applications.
- **Proximity hosting and co-location:** reduces latency to microsecond levels; most market data providers started offering proximity hosting, feeding market data directly from its database nearby/on the exchange. Exchanges can offer “raw” market data from its data center.



Order Management System (OMS)

OMS is a software-based platform that facilitates and manages the order execution of securities, typically through Financial Information eXchange (FIX) protocol. OMS's for the buy-side are concerned with connecting to the sell-side, whereas OMS's for sell-side have exchange connectivity.

OMS Basic Functionality

- ◆ Create and manage portfolios
- ◆ Monitor portfolio compliance
- ◆ Position keeping
- ◆ Allow straight through process
- ◆ Manage fundamental trading process

OMS Advanced Functionality

- ◆ Real-time profit and loss calculation
- ◆ Pre-trade/post-trade compliance functionality
- ◆ Operations management
- ◆ Accounting functionality
- ◆ In-house budgeting

Major OMS Providers in Asia



Example OMS User Interface

Manual Ticket Entry

Undrlyng	Description	Last	Bid	Ask	Accnt	Clearing	Action	Qty	Type	Lmt...	Rcpt Tm	Comm	Opn/...	Origin
CSCO	SEP 17 '10 25.0	0.57	0.56	0.57	Jones	MORGAN	BUY	25	LMT	0.58	12:13...			

Tickets

Undrlyng	Description	Key	Accnt	Clmg	Action	Ttl Qty	Type	Lmt Price	Rtd	Filled	Lvs	Wrkng	Nt Wr	Avg...	Status	Rcp	C	Op...
IBM	Stock (NYSE)	1	Jones	IB	BUY	2,000	MKT	MARKET	0	0	2000	0	2000	0.00	C	10		
DELL	Stock (NASDA...	3	Smith	IB	BUY	3,000	LMT	12.56	500	0	3000	500	2500	0.00	C	10		
DELL	FEB 18 '11 13...	5	Smith	M...	BUY	1	MKT	MARKET	0	0	1	0	1	0.00	C	10		

Orders

Undrlyng	Exchange	Description	Last	Change	Bid Size	Bid	Ask	Ask Sz	Type	Lmt Prc	Dest	Status	Rcpt Tm	Comm
			1.1		Jones	IB	BUY	100	LMT	152.43	SMART	T	12:13:54	
DELL	SM...	Stock (NASDAQ.NMS)	12.57	-0.67	190	12.58	12.59	95						
			3.1		Smith	IB	BUY	500	LMT	12.56	ISLAND	C	12:15:01	

Buttons

CXL Bid Up 0.01 Up 0.02 Mkt Down 0.01 Down 0.02 Ask CXL Mine CXL All ISW

Trades

#/	Action	Quantity	Underlying	Description	Price	Exch.	Time	Account	Key	Del	OMS C...	Prc Dfnc
BOT		1	CSCO	SEP 17 '10 27...	0.23	CBOE	12:11:37	Jones	6.1			

Execution Management System (EMS)

EMS applications are applicable for implementing any market dependent trading strategies, trading algorithms, real-time transaction cost analysis (TCA) and Indication of Interest (IOI).

EMS Features and Major Providers

- EMS typically offers trading interfaces, connectivity with more counterparties, execution management blotter and real-time market data.
- EMS is a lightweight application which is made to run on single desktop machines.
- Majority of EMS applications leverage FIX protocol for their DMA (Direct Market Access) and algorithmic executions.



OMS vs. EMS *

1. Traditional asset managers of any size will use an **OMS** to take advantage of broader functionality, including portfolio staging, compliance and post-trade support.
2. Traditional asset managers that trade infrequently and are less concerned with speed of execution will be well served by an **OMS**, which still provides options for routing trades, and provides the connectivity and compliance tools they need in order to manage their business successfully.
3. Traditional asset managers that trade actively, engage in list or basket trading, and require cross-asset-class trading capabilities will implement one or more **EMSs**.
4. Midsize or large traditional asset managers will deploy multiple **EMS** platforms on the desktop in order to placate traders who have individual preferences, to access broker liquidity offered only through a particular platform (prime broker) and to access third-party broker algorithms that may not be available through their current OMS.
5. Small hedge funds with one master fund are more likely to forgo an OMS and use an **EMS** because they desire speed of execution and don't have complex allocation instructions.
6. The few large hedge funds will employ multiple **EMS** platforms and also use an **OMS**.

❖ Source: *OMS/EMS Converge2*, *Advanced Trading*, September 26, 2006

Financial Information eXchange (FIX) Engine *

FIX engine is a piece of software that manages a network connection, creates and parses incoming and outgoing messages, and recovers in case of issues. In the context of trading, FIX engine is the interface to the outside world which allows users to trade and exchange related information in a standard fashion.

FIX Implementation

- Implementing FIX has different meanings depend on if you are using off-the-shelf OMS or building your own solution.
- FIX-enabled OMS comes in two flavors:
 - Some vendors select FIX engine and integrate it into their OMS
 - Some vendors allow clients to select which FIX engine they would like to use

How do FIX Engines Differ?

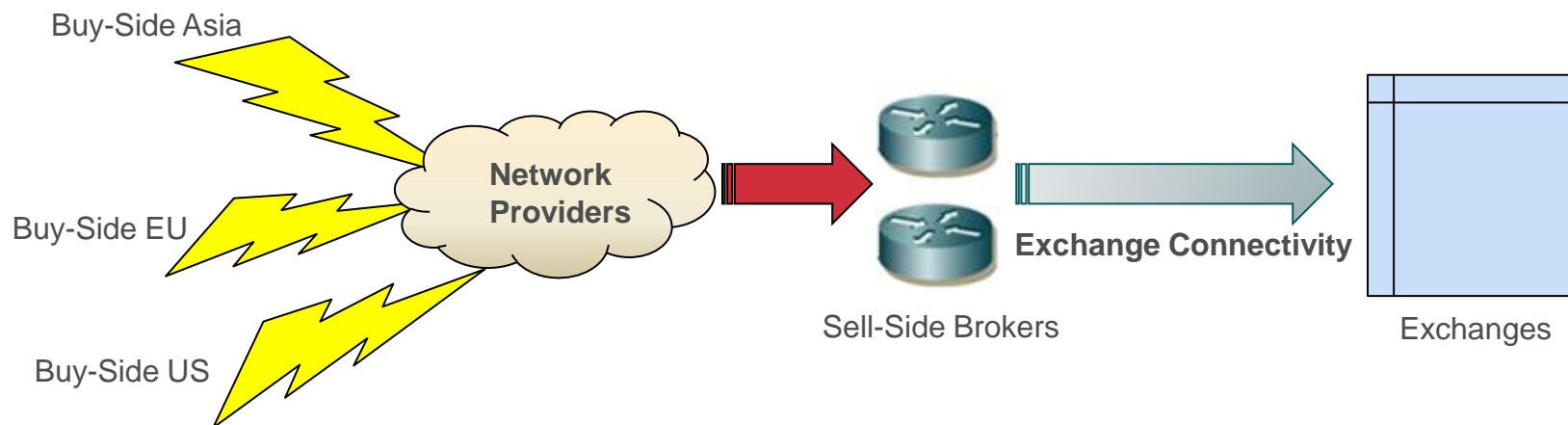
- All FIX engines do essentially the same thing but differ in three main way:
- Capabilities/Throughput
 - Does the engine support all current FIX versions?
 - Can the engine support different asset classes (e.g. fixed income, derivative, FX etc) ?
 - Does the FIX engine support a software-based, high volume and multi-threaded implementations?
- Platforms Used
 - Some FIX engines sell themselves on the basis that they will run on all platforms. They allow clients to select which FIX engine they would like to use. (Off the shelf)
 - Others take the opposite view and market themselves on the basis that they are optimized to run on one platform only. (Specialized)
- Support and Services Offered
 - How many updates and upgrades does your licence entitle you to have?
 - Is the cost reasonable? Is the vendor flexible around how you would like to pay?
 - Does the engine come with tools that allow monitoring of your FIX sessions?



Network Connectivity Providers

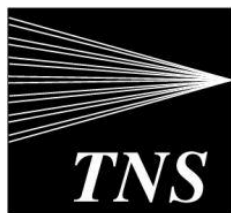
Network connectivity providers are firms which provide physical/logical link between buy-sides, sell-sides and the exchange. The connectivity is based on Point to Point (P2P) or Hub-Spoke Model and uses FIX protocol to give/receive instructions.

Network Connectivity Framework



Network Provider Operations and Major Players

- Network connectivity providers have fail-safe mechanisms in place and run 24 hour help desks in case of any network outages.
- The network provision charge is based on traffic on the link and there are bandwidth limitations per client.
- Network vendors go through systematic upgrades of their network lines to meet the demands of their buy/sell-side clients.
- Cheaper alternative for an individual broker to replicated connectivity



Public or Private?

Category	Company	Type	Ticker
Market Data Provider	Bloomberg	Private	N/A
	NYSE Euronext	Public	NYSE: NYX; Euronext: NYX
	Activ Financial	Private	N/A
	Thomson Reuters	Public	TSX: TRI; NYSE: TRI
Order Management System (OMS)	Charles River	Private	N/A
	ConvergEx Eze Castle	Private	N/A
	SunGard	Private	N/A
	Fidessa	Public	LSE: FDSA
	LineData	Public	Paris: LIN.PA
	ITG	Public	NYSE: ITG
	Tora	Private	N/A
Execution Management System (EMS)	Bloomberg	Private	N/A
	Trading Screen	Private	N/A
	EZX	Private	N/A
	Fidessa	Public	LSE: FDSA
	FlexTrade	Private	N/A
	Instinet Newport	Subsidiary	Parent: Nomura (8604.JP)
	InfoReach	Private	N/A
FIX Engine	Ullink	Private	N/A
	CameronTech	Private	N/A
	Onix Solutions	Private	N/A
	NYSE Euronext NYFIX	Public	NYSE: NYX; Euronext: NYX
	Javelin	Private	N/A
Network Connectivity Providers	TNS	Public	NYSE: TNS
	NYSE Euronext NYFIX	Public	NYSE: NYX; Euronext: NYX
	BT Radianz	Public	LSE: BT.A; NYSE: BT
	Bloomberg	Private	N/A
	Metabit	Private	N/A
	Thomson Reuters Autex	Public	TSX: TRI; NYSE: TRI

Exchanges & Alternative Trading Systems (ATS)

ATSs have risen in importance in Asia as an alternative to traditional exchanges; growing number of alternative venues in Asia have led to liquidity fragmentation and sophistication of investors in terms of selecting the different venues for best executions.

	Name	Lit	Dark	Markets	Ownership	Ticker
	Tokyo Stock Exchange	Yes	No	JP	Tokyo Stock Exchange	N/A
	Hong Kong Exchanges & Clearing	Yes	No	HK	Public Company	0388.HK
	Australia Securities Exchange	Yes	No	AU	Public Company	ASX.AX
	Singapore Exchange	Yes	No	SG	Public Company	SGX.SP
	Chi-East	No	Yes	JP/ HK/SG	Joint venture between Chi-X and Singapore Exchange (equally owned)	N/A
	Chi-X Japan	Yes	No	JP	Instinet (Nomura)	N/A
	Chi-X Australia	Yes	No	AU	Instinet (Nomura)	N/A
	SBI Japannext	Yes	No	JP	Joint venture between SBI and Goldman Sachs: SBI Holdings (35.7%), Goldman Sachs (37%), SBI Securities (10.0%)	N/A
	Kabu.com	Yes	No	JP	Kabu Securities (Mitsubishi UFJ Financial Group)	N/A
	VolumeMatch	No	Yes	AU	Australian Securities Exchange – Public Company	ASX.AX

Exchange Trading Statistics *

The equity trading business in Asia is different from the West where fragmentation, best execution and high frequency trading is the norm. These concepts are only in their infancy and monopolies hold sway.

Trading Volume and Value Comparison

Exchange	Trades (000s)	Global Rank	Market Cap (Trillion USD)
Shanghai SE	1,661,489.0	3	\$2.70
National Stock Exchange of India	1,556,620.5	4	\$1.50
Shenzhen SE	1,329,287.6	5	\$1.30
Korea Exchange	921,843.2	6	\$1.10
Bombay SE	555,719.3	7	\$1.60
Tokyo SE	334,676.9	8	\$3.80
Taiwan SE	232,740.0	9	\$0.80
HKEx	160,310.0	13	\$2.70
Australian SE	135,483.6	14	\$1.40
The Stock Exchange of Thailand	42,124.4	20	\$0.20

Asia exchanges account for 7 out of 10 of the top equity trading destinations in terms of volume in the world. Almost 7 billion shares traded and represent more than 58% of global turnover.

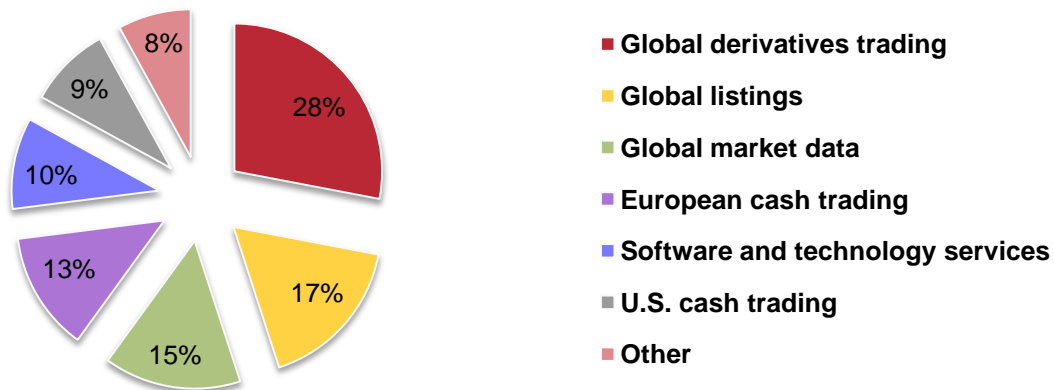
Exchange	Value (Million USD)	Change '09	Global Rank
Shanghai SE	4,496,193.5	-11.1%	3
Tokyo SE	3,787,952.3	2.3%	4
Shenzhen SE	3,572,529.1	28.9%	5
Korea Exchange	1,607,247.3	2.4%	9
HKEx	1,496,432.5	5.7%	10
Australian SE	1,062,649.5	33.1%	13
Taiwan SE	903,061.7	-0.2%	14
National Stock Exchange of India	801,017.2	1.2%	16
Singapore SE	289,307.2	17.1%	22
Bombay SE	258,695.6	-2.0%	24
TOTAL	18,275,085.9		

The value of shares traded tells a different story. In aggregate, the dollar value of shares traded across Asia is just above the number one ranked NYSE Euronext (\$17,795,600 million). This is due to the fact that equities trading in Asia is still a very **retail-oriented** business.

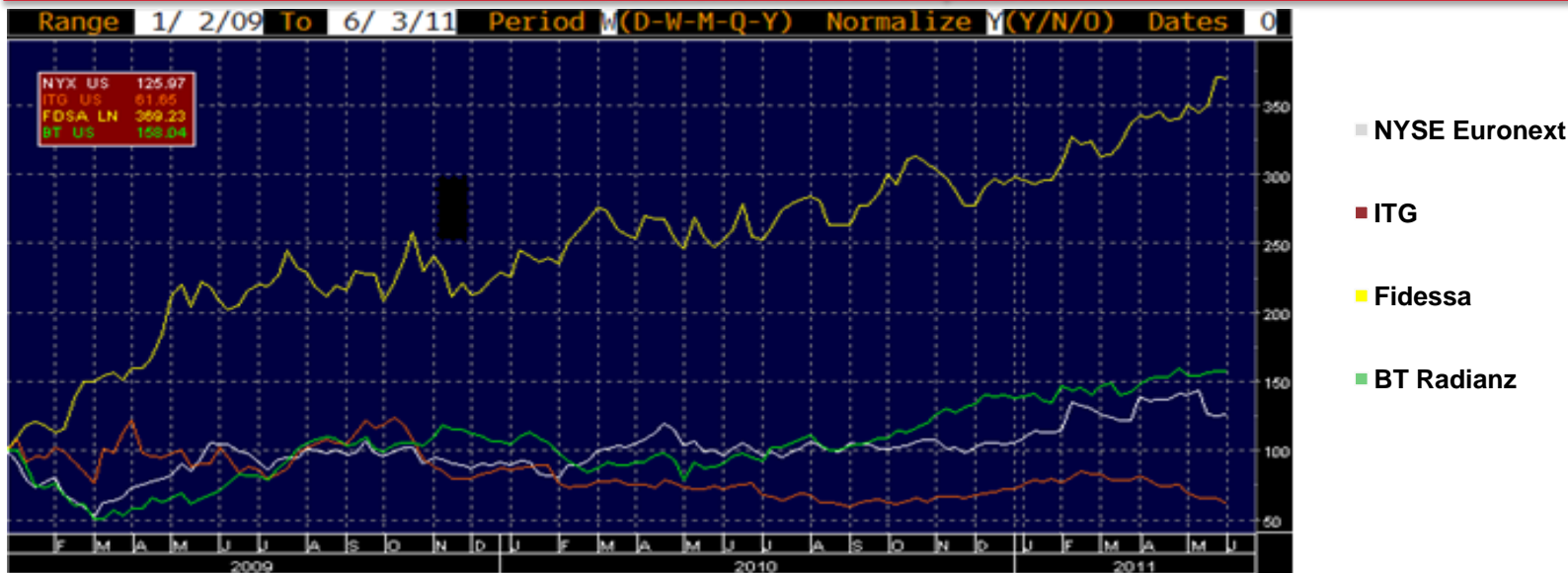
❖ Source: "2010 Exchange Statistics for Asia" Asia ETrading, February 11th, 2011

Exchange Trading Statistics

NYSE Euronext Business Diversification *



Stock Performance Comparison **



* Source: NYSE Euronext Homepage; <http://www.nyse.com/press/1265627527144.html>

** Bloomberg; Date Range 1/2/2009 – 6/3/2011

Conclusion

A transformational change is taking place in Asia. Exchanges without merger targets will actively hunt for partners, undeterred by rejections and anxious not to fall behind in the scramble to grow larger.

Potential Merger Scenarios *

■ SGX & Nasdaq

- The merger has been seen a possibility since former Nasdaq president, Magnus Bocker, left in 2009 to become CEO of SGX.
- SGX currently uses Nasdaq's trading technology.
- SGX, with \$6.5 billion in market cap, will almost certainly be the buyer of Nasdaq at \$4.6 billion.
- If merged, it will mark the first significant international deal involving an Asian exchange and would create geographically diverse operator trading multiple asset classes.
- As Deutsche Boerse agreed to takeover NYSE, Washington could be hesitant to accept the tie-up on the prospect of foreigners owning both of the country's traditional stock and listing markets.

■ SGX & LSE

- The merger will allow SGX to get stock-heavy foothold outside of Asia, this time solely in Europe.
- If LSE buys the Toronto Market, SGX-LSE-TMX would operate virtually 24 hours a day.
- In order to be competitive, SGX needs to go out of Singapore one way or the other. However, relatively tough limits across Asia on exchange ownership make it difficult for SGX to expand regionally. Hence, LSE would be the next feasible target if it fails to tie-up with Nasdaq.

■ Potential Predators/Preys

- Hong Kong Exchanges & Clearing (0388.HK)
- Chicago Mercantile Exchange (CME.O)
- Chicago Board Options Exchange (CBOE.O)
- Brazil BM&F Bovespa (BVMF3.SA)