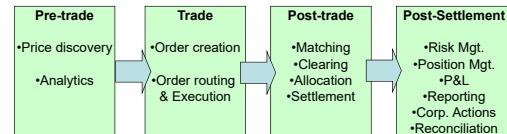


## The Trade Lifecycle

# BC3402 Financial Service Processes and Analytics

IT in the Trade Cycle (I) & (II)



• STP automates this entire process as much as possible

## Phase 1: Pre - Trade

### Pre-Trade: Price Discovery

“A crucial aspect of the role of trading is the generation and discovery of asset values through the marketplace” – Chester S. Spatt, former Chief Economist of SEC

- Supply and demand determines the market price : the “average” clearing price between buyers and sellers
- Market participants wants to know this price
- Exchanges provide information on these prices, alternative trading venues may be less efficient

## Price Discovery

- Regulations ensures that information of securities trading executed in exchanges should be made public
  - Order driven market**
    - Buyers/ Sellers orders are displayed in the market
    - Increase transparency but no guarantee of sale
    - E.g. NYSE
  - Quote driven market**
    - Prices are determined by dealers bid/offer quotes
    - Dealers hold inventory
    - Liquidity guaranteed by dealers, lower transparency
    - E.g. LSE, NASDAQ
- used when liquidity is low.*
- depends on instrument - multiple dealers to ensure market efficiency.*
- depends on order size*
- pre-trade structure*
- not sell in market*
- Buyer*
- Seller*
- 10.00 10.01*
- 10.13 10.00*
- 10.02 10.00*
- 4000 4000*
- due to a lag in time dealer earns spread / margin.*
- becomes seller to buyer and buyer to seller*



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## Order Driven Market

Order Driven Market			
Buy Orders		Sell Orders	
Shares	Price	Shares	Price
134,084	42.64	59,100	42.65
477,634	42.63	184,969	42.66
387,190	42.62	195,682	42.67
190,780	42.61	372,964	42.68
250,441	42.60	300,630	42.69
252,286	42.59	162,506	42.70
526 Buy Orders		445 Sell Orders	



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OTC Markets

*buyers earn a huge spread.*

## Limits and Compliance Check

- Built in pre-trade analytics to ensure compliance
    - Credit risk compliance (credit limit for clients/ dealer)
    - Market risk compliance (limit on volume for a single equity) – moral hazard
    - Trading restrictions
      - Restrict specific equity e.g. “sin” stocks
    - Regulatory compliance
    - Prevent trades that are non-compliant e.g. wash sale
- by under cutting bidding for casing case*



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### FOR IMMEDIATE RELEASE 2014-274

Washington D.C., Dec. 10, 2014 — The Securities and Exchange Commission today penalized Morgan Stanley & Co. LLC for violating the market access rule when it failed to uphold credit limits for a customer firm with a rogue trader who engaged in fraudulent trading of Apple stock.

The market access rule requires broker-dealers to have adequate risk controls in place before providing customers with access to the markets. An SEC investigation found that Morgan Stanley, which offers institutional customers direct market access through an electronic trading desk, did not have the risk management controls necessary to prevent the rogue trader from entering orders that exceeded pre-set trading thresholds. The trader exploited the market access and, without Morgan Stanley’s knowledge, committed a fraud that eventually shuttered the firm where he worked. The SEC and criminal authorities have since charged the trader with fraud, and he has been sentenced to 30 months in prison.

Morgan Stanley agreed to pay a \$4 million penalty for violating the market access rule.



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- Pre-trade

  - 1) what type of markets? (OTC, order, quote)
  - 2) Checks
  - 3) Pre-trade Analytics

## Pre-trade Analytics

- Two goals: portfolio analysis and best execution
  - Portfolio Analysis
    - Simulate the impact of portfolio changes in the long run
    - Front-office software
    - Off-the-shelf, in-house developed, customization
    - Examples: Murex, Sungard



SunGard - Asset Arena Portfolio Management, Investment Management - Windows Internet Explorer

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## ASSET ARENA PORTFOLIO MANAGEMENT

Optimizing efficiency and accuracy are keys to successfully managing investments globally. Asset Arena Portfolio Management gives you firm essential tools to integrate all aspects of your portfolio management, from the pre- and post-settlement process, and achieve internal and external straight-through processing. The system gives your staff access to robust portfolio management features, while scalable functionality helps accommodate the growth of your client base and your firm.

**Features**

- Provides ASP delivered browser-based user interface with customizable menus and drill-down navigation
- Includes portfolio modeling, rebalancing, "what-if" analysis", pre-trade compliance, order creation, order management and post-trade compliance
- Helps enable extensive performance measurement including the calculation and storage of rates of return at any level down to the security level, composite management and benchmark management
- Automates the pre- and post-settlement trade cycle including matching, affirmation and institutional retransmission

Expand All | Collapse All

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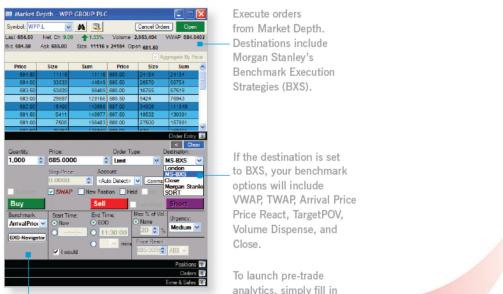
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## **Best Execution/ Transaction Cost Analysis (TCA)**

- Best execution
    - Best price, fastest execution speed and lowest transaction cost for a trade
  - TCA:
    - Explicit costs: brokerage fees, exchange fees, taxes
    - Implicit costs: loss of price advantage due to timing and market impact
    - Implementation shortfall: difference between price of the security when order was given and the cost (price) of it for the buyer (seller)
    - TCA: all about minimizing implementation shortfall

## Integration of Pre-trade and Trading Technologies



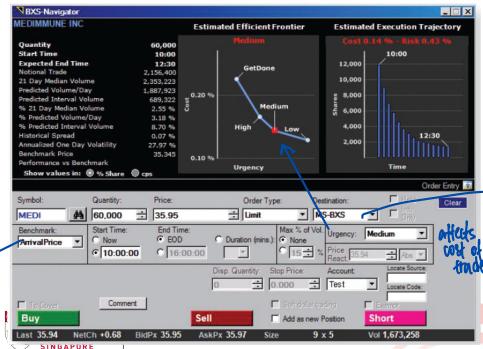
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Execute orders from Market Depth. Destinations include Morgan Stanley's Benchmark Execution Strategies (BXS).

If the destination is set to BXN, your benchmark options will include VWAP, TWAP, Arrival Price, Price React, TargetPOV, Volume Dispense, and Close.

To launch pre-trade analytics, simply fill in trade details and click on BXN Navigator.

## Integration of Pre-trade and Trading Technologies



Pre-trade Analytics

When the order is  
routed to:  
>exchange / ATS

## Phase 2: Trade



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## Order Routing & Execution

- Trading instructions sent from buyer/ seller / buy-side institutions to broker
- Broker creates the order and send it to:
  - Exchange
  - ECN ≈ ATS (just slightly diff in regulatory compliance)
  - OTC
  - Internalize (purchased by the broker/dealer)



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## Trade: Order Creation

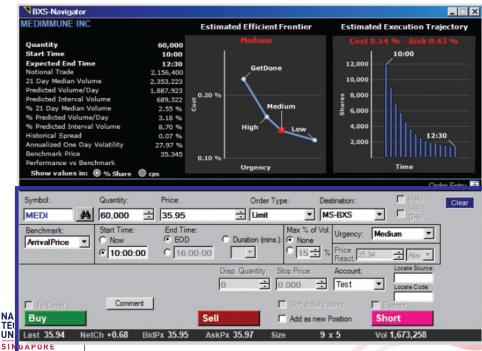
- Trade ticket consist the following information
  - Security identifier, e.g. C, GOOG
  - Buy or sell flag
  - Type of order e.g. limit order/ market order
  - Quantity to be traded
  - Trade date
  - Marketplace to trade or best execution venue



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## Example of an Order (Screenshot)



## Order Management Systems

- Take in real-time data feeds from marketplaces
- Orders can be routed to “any” marketplaces
- Efficiency of the system is measured by four factors:
  - Execution price – how close is it from the benchmark *national best bid or offer (NBBO)*
  - Price improvements – how much better does it beat the NBBO



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## Order Management Systems

- Factors (cont'd)
  - Execution speed – time that elapsed between the time broker receives an order to the time the order is executed
  - Effective spread – the distance from the midpoint of the market at the time when your order is entered to the execution price you receive
- Mix of in-house developments and some off the shelf e.g. Sungard Brass OMS
- Shift towards the DMA market due to buy-side demand
- Built-in algorithm trading



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SunGard Adds UBS Electronic Trading to Its Brass OMS | A-Team Group - Windows Internet Explorer

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SunGard Adds UBS Electronic Trading to Its Brass OMS

At 10 Nov 2008 16:07:05 in Algorithmic Trading, Electronic Trading, E

SunGard is providing access to UBS Equities' electronic market (EMS) and algorithmic trading strategies in the U.S. through its Brass order management system (OMS). Brass customers will be able to access UBS trading strategies through their current Brass interfaces. They will also be able to execute each strategy based on their own parameters such as pricing, pacing and aggression level.

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How has the current market environment affected your trading technology budget for 2009?

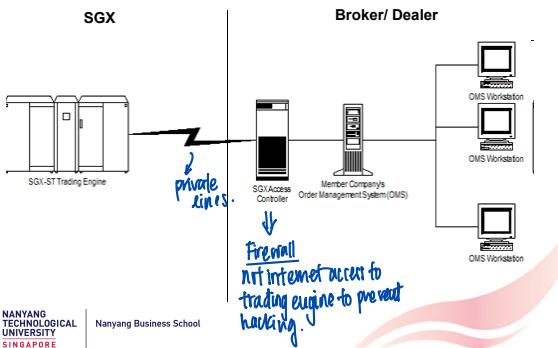
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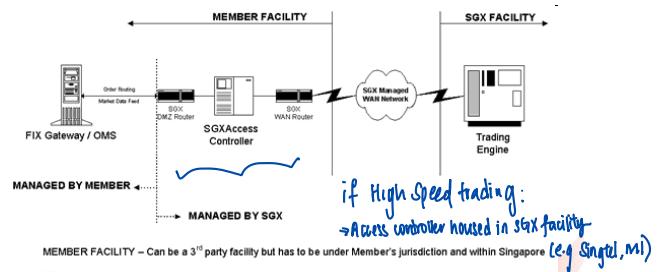
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## Trading Technology (SGX Access)

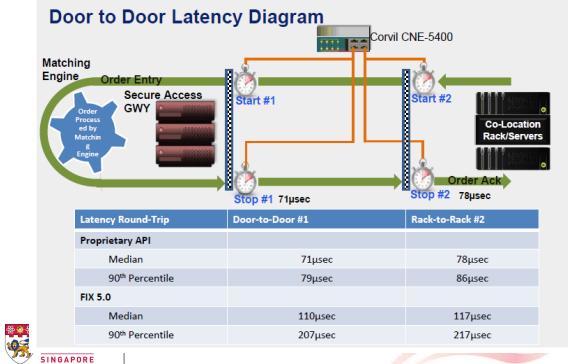


## SGX Access (Equities)



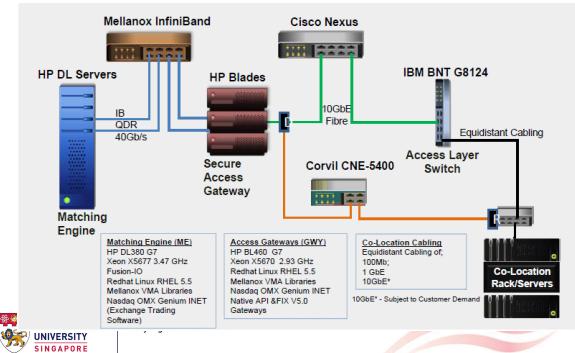
## Connection (SGX Reach)

Door to Door Latency Diagram



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## Technology Architecture – SGX Reach

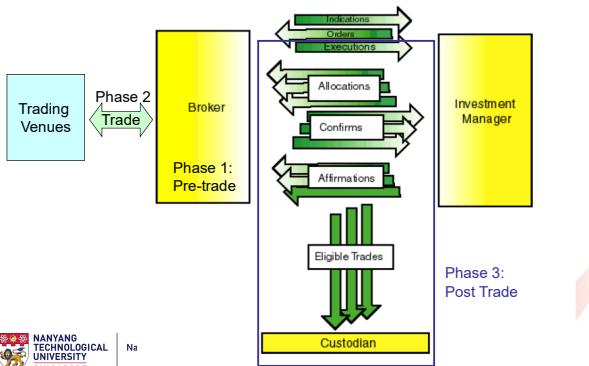


## Phase 3: Post-Trade *(Institutional trade)*

## Post-Trade

- Process may vary depending the trading parties involved. E.g. broker-to-broker trade or institutional trade. We discuss the more complex institutional trade
- A mutual funds manager contact the broker-dealer to sell X shares. The trade has been executed e.g. shares are sold successful in an NYSE.
- So what happens next?

## Institutional Trade



## Confirm/ Affirm

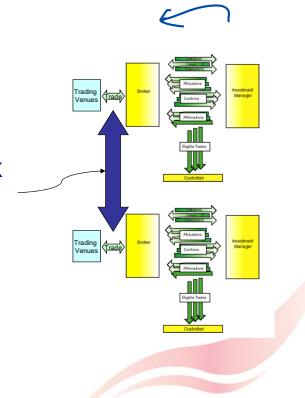
- Broker-dealer (BD) sends the fund manager a notice of execution (NOE), containing the details of the trade
- The investment manager will send the allocation details of the client to the BD
- BD send the confirmation for each allocation
- Investment manager affirms
- After affirmation all orders are send to a clearing facility

## Confirm/Affirm Technologies

- Outsourced by many brokers/ dealers
- Omgeo (Thomson Reuters): the leading post trade management solutions
- Processes 1 million institutional trades per day serving 6000 investment managers and BD.
- Confirms most trade by T+0, affirms by T+3
  - affirmation rates: 23% T+0, 85% T+1, 88.5% T+2

## Trade Matching

- Involves matching the trade details from the buying broker and the selling broker
- Performed by clearinghouses e.g. SGX
- Outsourced to 3<sup>rd</sup> parties e.g. Omgeo
- Successful matches are then sent to the clearinghouses for clearing



## Allocation and Settlement

- Performed by clearinghouses e.g. Depository Trust & Clearing Corp (DTCC), Central Depository (CDP)
- Novation occurs: replacing contract between counterparties with 2 new contracts with the clearinghouse.
- Clearinghouse is the buyer for the seller and the seller for the buyer
- Absorbs counterparty risks



## Allocation and Settlement

- Clearinghouses facilitate the final settlement of trades – transferring ownership of shares electronically and allocating them to the rightful owner
- Enforces Receive-versus-payment (RVP) and Delivery-versus-payment (DVP) instructions
  - RVP – payment by money
  - DVP – payment immediate on delivery

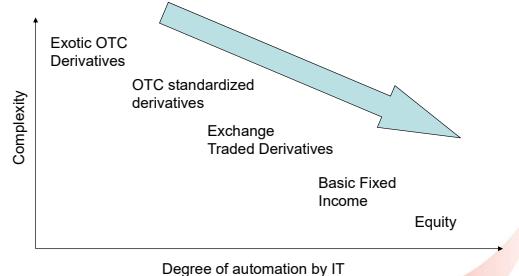


## Allocation and Settlement

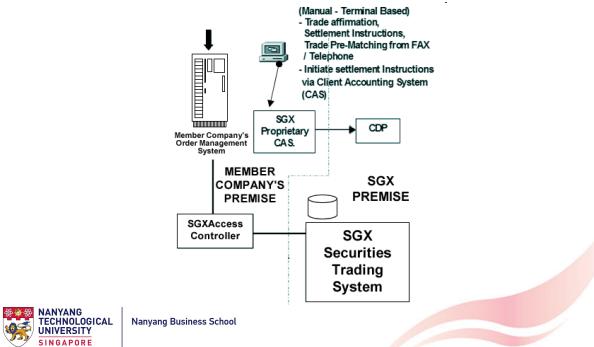
- Ensure payments are successful through FedWire/ CHIPS between financial institutions before transfer of the securities
- From T+3 to T+1:
  - T+5 before 1995
  - T+3 since then
  - SEC target of T+1 by 2005 failed
  - Industry focus on setting up infrastructure for STP



## Degree of Automation by IT for Different Asset Classes



## Clearing / Settlement (SGX)



## Phase 4: Post-Settlement

### Post Settlement

- Trade process does not end with settlement, there is an entire list of activities following it
- **Collateral Management**
  - Evaluating credit risk of counterparty
  - Require counterparty to provide collateral to engage in trades
- **Position Management**
  - Snapshot of current trading position and all outstanding orders at any time

### Post Settlement

- **Risk Management**
  - Market risk, credit risk, operational risk
- **Profit & Loss Accounting**
  - Marking a position in the market
  - Continually calculate profit and loss based on real-time market data
- **Reconciliation**
  - Ensuring one “golden” copy of transaction
  - Reconcile in earlier or later stages?

## Post Settlement

- Reporting
  - Management accounting reports
  - Annual or quarterly reports
  - Performance reports to clients
  - Compliance report to regulatory bodies e.g. SEC, FDIC etc.

## Mapping to Technological Operations

### Front Office

- Analytics
- Limits & compliance check
- Order creation
- Order routing
- Order execution

### Middle Office

- Risk Mgt
- Position Mgt
- Profit & Loss acct.
- Trade detail enrichment

### Back Office

- Settlement
- Collateral Mgt.
- Corporate Action Monitoring
- MIS reporting
- Reconciliation

# Post trade

