

Trading Technologies

Effects of Competitive Pressure and Market Regulation in Today's Market Environment

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Changing Market Environment

- Drivers of Change
- Impact of Change
- Business Challenges
- Technology Approaches

Drivers of Change

□ Regulation

- Market Structure (e.g. NMS)
- Risk Monitoring (e.g. Sarbanes Oxley, Basel II)
- Order Tracking (e.g. OATS, OTS)
- Price Transparency (e.g. NASD-TRACE, MSRB-RTRS)

□ Competitive Pressure

- Performance Improvement
 - Cost Reduction
 - Customer Service
 - Product Differentiation
- Reduce Commissions
Minimize Market Impact
Price Improvement

Impact of Change

- Value-Added Product Offerings
 - Prime Brokerage services expanded
 - Algorithmic models
 - Direct Market Access
 - Quantitative trading
 - Program trading
 - Credit derivatives
 - Cross-product strategies
- Market Center Strategies
 - US markets
 - NYSE – Hybrid Market (Direct +), ArcaEx
 - NASDAQ – Brut, INET
 - Global Markets
 - Primarily electronic (<20% floor-based trading)
 - Integrated market strategies - trading through clearing/settlement
- Market Data Volumes
 - Message volumes have doubled each year (FIF statistics)
 - OPRA 1-minute peak now 55,000 messages per second
 - Quote-to-trade ratio doubled over the last year – now 2400 quotes per single trade
 - Financial impact on data-consumer infrastructure and vendor costs
 - Market structure impact – 2-tiered market

Value-Added Services

□ Business Challenges

- Client Support Requirements
 - Prime Brokerage, institutional and retail
- Reduce Processing Costs (STP)
 - Diminishing spreads (commissions) require greater efficiency
- Monitor/Control Risk
 - Credit – Counterparty – Market risk

□ Technology Approaches

- Reference Data
 - Normalization and consolidation
 - Multiple evolving commercial services
 - Outsourcing models
- Electronic Connectivity
 - Support clients direct connections (FIX)
 - Sponsor/host direct access methods (DMAs, Algos)

Trade Support

❑ Business Challenges

- Order capture
 - ❑ Various levels of customer automation
- Trade routing
 - ❑ Finding the BBO and liquidity pools in a fragmented market
 - ❑ Increases in canceled orders result from looking for hidden liquidity
- Trade reporting
 - ❑ Reconciliation of transactions/information across different systems/platforms (e.g. order management and trading platform vs. back-office)
 - ❑ Process flow – should reporting be driven from front- or back-office systems?

❑ Technology Approaches

- FIX leveraged to support electronic order management
 - ❑ Facilitates broker/dealer order handling and reporting requirements
 - ❑ Integrated with buy-side OMS and in-house order management systems
- Finding Hidden Liquidity
 - ❑ Desktop integration and ASP solutions provide smart order routing (e.g. Lava , Portware, “pinging” for market depth)
- Algorithmic Trading
 - ❑ Automates “easy” orders
 - ❑ Lower transaction costs and limits market impact
 - ❑ Supported by FIX – expanding message capabilities to include Trading Strategies (e.g. VWAP, benchmarks)

FIX Functionality Matrix

Functionality	FIX 4.0 [Jan 1996]	FIX 4.2 [Mar 2000]	FIX 4.4 [Apr 2003]
Equities			
• Basic Order flow, IOIs, Advertisements, and Quotes	Good support	Good support	Good support
• Allocations & Program Trading	Some Support	Good support	Good support
• Market Data	No support	Good support	Good support
• Confirms/Affirms and Trade Reporting	No support	No support	Good support
Futures & Options			
• Basic Order flow, Quotes, Market Data, Allocations	No support	Good support	Good support
• IOIs and Advertisements	Some Support	Good support	Good support
• Multi-leg Order flow	No support	Some Support	Good support
• Confirms/Affirms, Trade Reporting, Position Maintenance/Reporting	No support	No support	Good support
Fixed Income			
• IOIs (offerings)	Some Support	Some Support	Good support
• Basic Order flow, Quotes, Allocations	No support	Some Support	Good support
• Multi-leg Order flow, Confirms/Affirms, Trade Reporting, Collateral Management	No support	No support	Good support
Foreign Exchange			
• Basic Order Flow (spots and forwards) and Quotes	No support	Good support	Good support
• Allocations	No support	Some Support	Some Support
• Basic Order Flow (swaps) and Market Data (RT executable prices)	No support	Some Support	Some Support
• Confirms/Affirms and Trade Reporting	No support	No support	Some Support
General			
➤ News & Email	Good support	Good support	Good support
➤ Number of Business Messages	20	39	86
➤ Number of Fields	138	396	914

Source: FIX Protocol Ltd., March 2005

Legend:

	No support
	Some Support
	Good support

Managing Market Data

□ Business Challenges

- Handling volume of real-time market data
- Reducing latency
- Managing distribution for efficiency
- Managing entitlements for compliance and control

□ Technology Approaches

- Exploring direct sourcing of exchange feeds
- Reduce message size
 - FIX Market Data Optimization Working Group formed to address requirement for combined order information and market data
- Major vendors providing other sourcing alternatives
- Homegrown vs. commercial alternatives for data distribution
- Entitlement management systems/procedures
 - In the spotlight with overall corporate focus on full compliance

Apply Technology to Meet Business Challenges

- Front-office order management and reporting
 - Fully engage FIX
- Mid/back-office trade processing
 - Reference data initiatives
- Market data capacity
 - Improvements in distribution and compliance techniques
- Vendor management
 - Keep pressure on incumbent service providers to support your firm's agenda
- Industry involvement
 - FIX messages to meet business requirements
 - SIA institutional trading
 - FIF tracking developments in Reg NMS
- Infrastructure support
 - Rely on people that understand the business, not just the technology