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Bringing e-trading oversight up to speed

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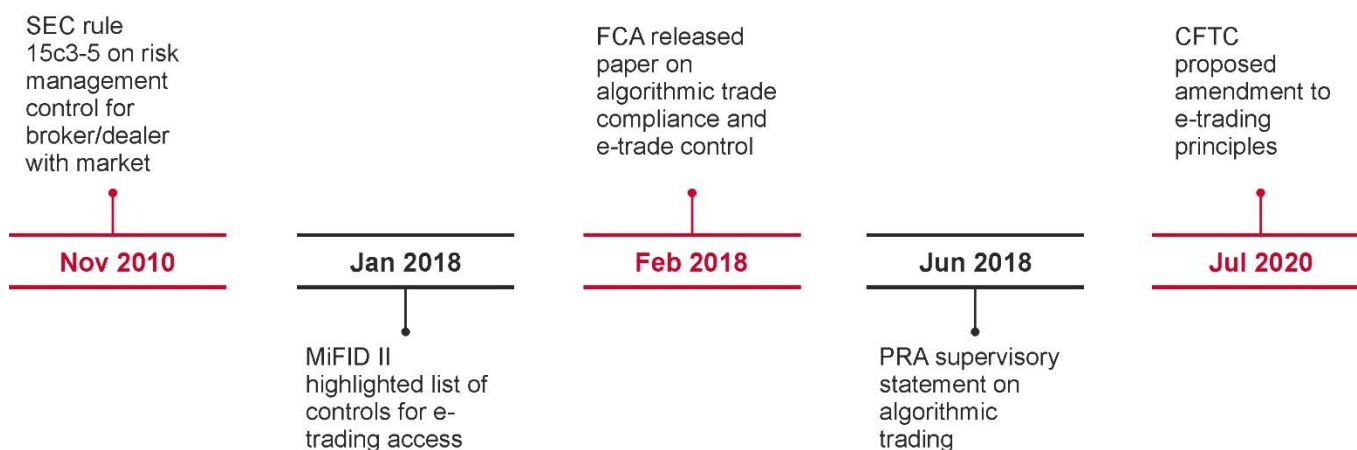# 1   What has changed in e-trading risk?

Electronic trading, or e-trading, platforms keep evolving to meet changing market needs such as complex trading strategies and multi-asset class coverage. That, along with a rising number of trading venues, protocols and products have spawned challenges not just for traders and risk managers, but clients, too, who are demanding greater transparency and control over execution quality.

The changing structure of financial markets and gaps in risk management can turn otherwise manageable errors in the course of e-trading into extreme events with widespread ramifications, including regulatory fines. One of the most tumultuous events in recent history – the Covid-19 pandemic – has contributed to an increase in e-trading volumes on the one hand and frequent breaches of risk parameters on the other. All this calls for resilience in e-trading infrastructure and a tighter risk-management regime.

In this paper, we evaluate and compare different regulatory asks across the world and highlight approaches that help strengthen compliance. We also explore the possibility of using automation as a tool to overhaul e-trading risk-management processes.

2   The evolving regulatory framework

Regulators have for long kept a close watch on e-trading infrastructure and environment, owing to its far-reaching ability to define, control and manipulate transactions at a global scale. The risk-management framework has continued to evolve since the US Securities and Exchange Commission's SEC 15c3-5 rules a decade ago, and reached a definitive stage of providing high-level risk principles (*see chart below*).

SEC rule 15c3-5 on risk management control for broker/dealer with market		FCA released paper on algorithmic trade compliance and e-trade control		CFTC proposed amendment to e-trading principles
Nov 2010	**Jan 2018**	**Feb 2018**	**Jun 2018**	**Jul 2020**
	MiFID II highlighted list of controls for e-trading access		PRA supervisory statement on algorithmic trading	

3   Regulatory approaches to e-trading risk management

Different regulators issue different risk-management guidelines for e-trading services.

The Markets in Financial Instruments Directive (MiFID) II, for instance, provides detailed guidelines covering governance, system testing and deployment, resilience and direct electronic access. The Financial Conduct Authority (FCA) and Prudential Regulation Authority (PRA) also provide comprehensive guidelines, though with a specific focus on algorithmic trading. The Commodities Futures Trading Commission (CFTC) and the SEC take different high-level approaches with some flexibility to firms, while developing risk-management principles. CFTC,

for example, recognises that banks generally have established basic levels of risk-management infrastructure and provides only the risk principles that trading platforms/banks should follow.

Comparison of e-trading controls prescribed by various regulatory bodies

Parameter	Sr no	Controls	MiFID II	FCA	CFTC	SEC rule 15c3-5	PRA
General organisational requirement	1	Centralised and formal governance	√	√	-	√	√
	2	Clear accountability	√	√	-	-	√
	3	Separate trading and support functions	√	√	-	-	-
	4	Informed compliance staff	√	√	-	-	√
	5	Internal and external audit	√	-	-	-	√
	6	Skilled staff	√	√	-	-	√
	7	Methodologies to develop algorithms	√	√	-	-	√
	8	Senior authority to test system	√	√	-	-	-
	9	Trading venue testing	√	√	-	-	√
	10	Record keeping and documentation	√	√	-	√	√
	11	Inventory of algos systems	-	√	-	-	√
	12	Inventory of risk controls	-	-	-	-	√
	13	Escalation metric	-	-	-	-	√
	14	CEO (or equivalent) certification	-	-	-	√	-
Testing and deployment	15	Conformance testing	√	√	√	-	√
	16	Testing separated from the production environment	√	√	√	-	√
	17	Controlled deployment of algorithms	√	√	-	-	-
	18	Audit trails	-	√	-	-	-
Post-deployment assessment	19	Annual self-assessment	√	√	-	√	√
	20	Stress testing	√	-	-	-	√
Resilience	21	Kill functionality	√	√	√	-	√
	22	Automated surveillance	√	√	-	-	-
	23	Business continuity arrangements	√	-	-	-	√
	24	Pre-trade control	√	√	√	√	-
	25	Real-time monitoring	√	√	√	√	-
	26	Real-time alerts	√	√	√	-	-
	27	Post-trade control	√	√	√	√	√

Parameter	Sr no	Controls	MiFID II	FCA	CFTC	SEC rule 15c3-5	PRA
	28	Security and limits to access	√	-	√	√	-
	29	Adjustment of controls	-	√	-	-	-
Direct electronic access (DEA)	30	DEA control	√	-	-	-	√
	31	Due-diligence of DEA clients	√	-	-	√	√
	32	Annual review of DEA clients	√	-	-	-	-
Clearing services	33	Due-diligence of prospective clearing clients	√	-	-	-	-
	34	Position limits to clearing clients	√	-	-	-	-
	35	Disclosure about services	√	-	-	-	-
Market conduct	36	Checking market abuse	-	√	-	-	-

4   An approach to meet regulatory asks

4.1   Adopt a trade lifecycle approach

The regulatory approach analysis above suggests that e-trading risk-management infrastructure may be best constructed around the various stages of the trade lifecycle. This could help manage individual processes better. Risk-management processes can be divided into pre-and post-trade.

Pre-trade: This pertains to managing risk around deployment of e-trading systems and trade limits. They are an important part of the software development lifecycle (SDLC) of such systems. Firms should have a pre-trading risk framework with respect to trade price, value, volume, trade permission, and market and credit risk limits. Systems should be fully tested before deployment under the authority of senior management designates, with a pre-defined trading limit. Firms must also define pre-trade risk-management principles on order entry and monitor all trading activity on a real-time basis. They must build integrated operational safeguards, which include alerts, blocks, and kill switches for trades, and check for stale/duplicate orders, looped orders, and fat-finger orders. Limit management systems must comprise multiple layers to cover firm, client and order level limit checks.

Post-trade: This provides real-time monitoring and alerts in cases of breaches. The risk framework should be built around escalation metrics and have the ability to reverse actions such as 'kill functionality', allowing cancellation of all executed orders with immediate effect to minimise losses. The framework for incident management should be built for detecting, escalating and resolving incidents.

The schema of a typical e-trading workflow with risk-management controls is below *(control serial numbers in box should be read with the table on regulatory comparison for e-trading control).*

Illustrative e-trading workflow with risk-management controls
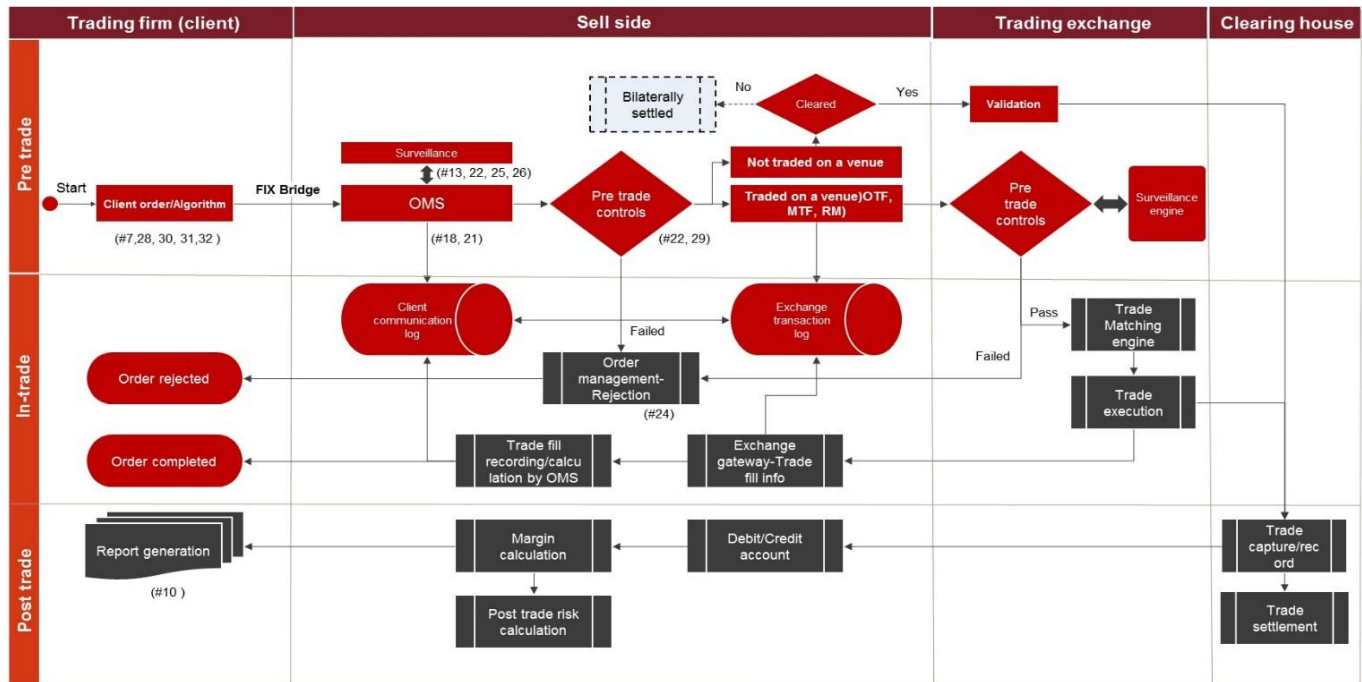
Note: Numbers below boxes in the above flow chart correspond to control serial numbers in the regulatory comparison table

4.2 Periodically review the SDLC

The SDLC for e-trading platforms and system development must be regularly reviewed. It should have inherent standards for code development, approval, testing and deployment. In algorithmic trading, firms must allow changes to pre-defined variables in the code on-the-fly. They should also build limitations on how these changes serve to contain the risk caused by the changes. There should be a risk hierarchy in the SDLC for the impact of changes such as in trade flow and compliance. Firms must also analyse existing e-trading flows and identify potential failures in functional architecture, upstream and downstream systems, and creases in trading algorithms.

4.3 Formalise process governance

For small- and mid-tier banks, issues still revolve around strong governance, building and strengthening of e-trading risk-management issues ranging from kill switches to audit trails. A clear and formalised governance framework within firms is also essential. Compliance staff must have a general understanding of e-trading. They, along with technical, legal, and risk-monitoring staff must also be formally trained. An automated surveillance system to detect market manipulation is a *sine qua non*, too.

Firms must carry out annual self-assessment and issue a validation report on the e-trading system and strategies, risk-management framework and stress testing. Documentation has also been a weak spot for e-trading, so a structured documentation of algorithms and tools is critical. Model risk management within the e-trading process flow needs to be considered separately.

4.4 Manage data availability and quality issues

Data quality has been a stumbling block for banks in e-trading risk management, hindering automation. Insufficient trading data is also a concern in building advanced Artificial Intelligence (AI) / Machine Learning (ML) algorithms. Third-party data providers have been working to resolve this partly with managed data services. A comprehensive enterprise-wide data solution with advanced data management capabilities for e-trading risk management is the way forward.

4.5 Leverage technology and activate automation mode

Large banks already have a basic level of risk-management infrastructure in place. The challenge here is automation (dealer selection and execution), which can help firms focus on the more important and less-liquid trades.

Technology – a game changer in e-trading – has increased efficiency, improved risk-management capabilities for faster and better execution of trades, and helped better regulatory compliance. Some of the tools that could be used in risk-management systems are:

1. **Trade surveillance analytics platform:** Such platforms detect compliance violations, provide cross-market surveillance, curb market manipulation, and flag suspicious transactions. They use advanced technologies such as Big Data analytics to generate real-time monitoring of violations.

2. **Fault-tolerant e-trading system:** A modular system allows components to fail individually without forcing all users off the platform, or cause a systemic crash/downtime. Its ability to self-diagnose eliminates unplanned downtimes and reduces the impact on internal compliance processes and regulatory compliance issues.

Fundamental architecture of fault-tolerant e-trading system
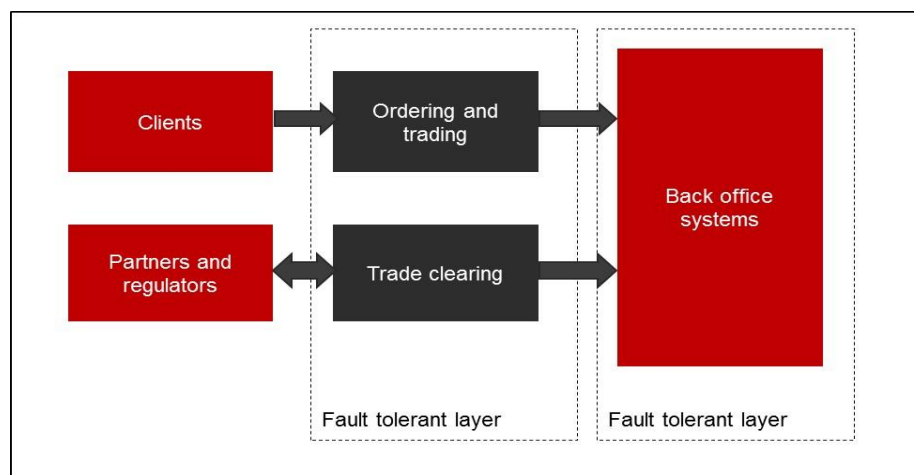
3. **Third-party application for value-added services:** Traders are increasingly using third-party financial and data analytics platforms to get the most out of raw data. Third-parties also provide application programming interface (APIs) that can be combined, customised and integrated with trading platforms to provide bespoke solutions. Traders prefer API solutions that translate multiple-execution-venue APIs into single APIs. Single APIs are also trying to cater to multiple asset classes.

4. **Automation:** Automation is helping firms adhere to regulatory guidance around setting up pre- and post-trade risk-management infrastructure. E-trading is an opportunity for the trading desk to automate execution workflow and boost productivity. Automation could benefit by:

   a. Allowing breakdown of incoming orders by categories for better execution

   b. Ensuring that best execution policies are always applied as a business rule

   c. Enabling robust control and compliance by removing human bias and errors

   d. Catering to multi-asset environment, while capturing nuances of every asset class

   e. Providing options to select from a multi-dealer request for a quote in the fixed-income space

5. **AI/ML:** Since the advent of AI/ML, the banking industry has been trying to find use cases for e-trading. The hype around fixed-income e-trading has finally started to yield tangible solutions. Some popular use cases are:

   a. Robot advisors: Provides automation to analyse millions of data points near real-time

   b. Historical trading patterns identification: Uses AI/ML to help identify and replicate

   c. Natural Language Processing techniques: Helps traders execute sentiment-based predictive trading by analysing news headlines and social media comments and in forecasting trade trajectory

   d. Neural network: Helps identify and analyse trend factors leading to price changes

   e. Blockchain: Automates settlements and provides real-time reconciliation using distributed ledger technology, impacting e-trading in a big way

5   How CRISIL can help

CRISIL's traded-risk practice has helped banks across the globe in their journey to efficient e-trading systems, and build and enhance strong risk management around their e-trading infrastructure.

CRISIL's Centre of Excellence for Smart Automation uses the latest technologies to cater to existing e-trading clients. Fulkrum, CRISIL's next-generation proprietary platform, enables clients to leverage AI/ML capabilities and provides Big Data analytics and reporting services.

CRISIL has also helped firms with development, enhancement, and retirement of third-party applications for e-trading. Our customised due-diligence has helped clients take buy versus build decisions for e-trading platforms

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