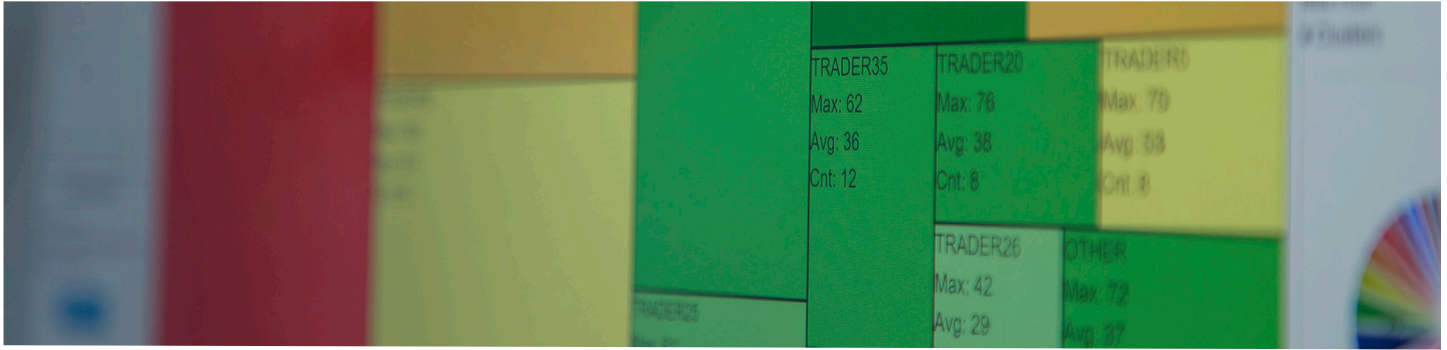


# THE ULTIMATE TRADE COMPLIANCE TOOL

Use TT® Score's machine learning technology to identify patterns of behavior that pose the greatest regulatory risk with unparalleled precision.



Get complete transparency into your firm's compliance risk and trader behavior with minimal effort. Take proactive steps to prevent disruptive or manipulative trading activity before it becomes a problem.

## IDENTIFY RISK

Detect potential high-risk activity using advanced pattern recognition and flag hidden threats well before disaster strikes.

## AVOID VIOLATIONS

Discover regulatory and compliance issues before violations happen, preventing fines and enforcement investigations.

## OPTIMIZE OPERATIONS

Streamline compliance and risk reviews by identifying, prioritizing and addressing higher risk activity sooner and more efficiently.

## DETECT ANOMALIES

Find outlier events by understanding historical trends, environmental context and correlation within firm activity.

## INSTANTLY ENABLE FOR USE WITH TT

Immediately monitor and evaluate order activity for all traders and allow individuals to monitor their activity.

## SURVEIL USERS OF OTHER PLATFORMS

Use FIX Drop Copy to pull order activity from any platform into the TT platform and store it indefinitely.

## ADVANTAGES OF MACHINE LEARNING FOR TRADE SURVEILLANCE

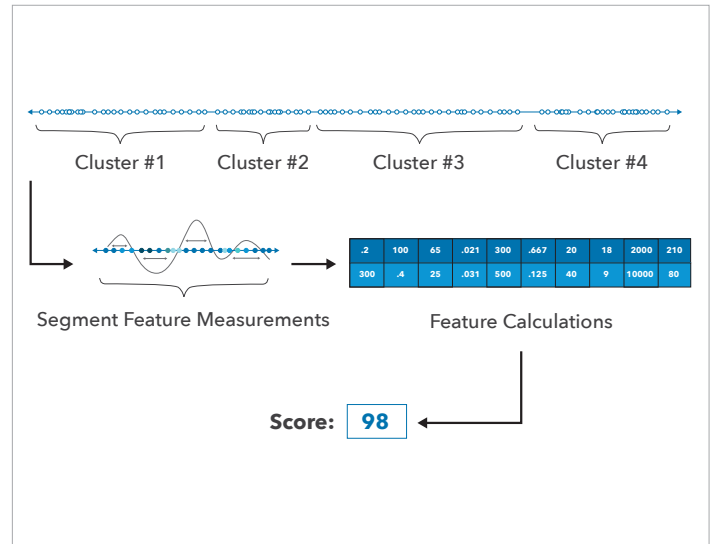
- ◆ Train surveillance models with historical case data—no strict decision trees.
- ◆ Aggregate results of trading activity based on behavioral intent.
- ◆ Score all trader activity based on similarity to patterns from known cases.

## CATCH MULTIPLE TYPES OF POTENTIALLY PROBLEMATIC ACTIVITY

- ◆ Spoofing behavior including layering, flipping and vacuuming
- ◆ Abusive messaging
- ◆ Momentum ignition
- ◆ Pinging and phishing
- ◆ Wash trading

## CLUSTER AND SCORE

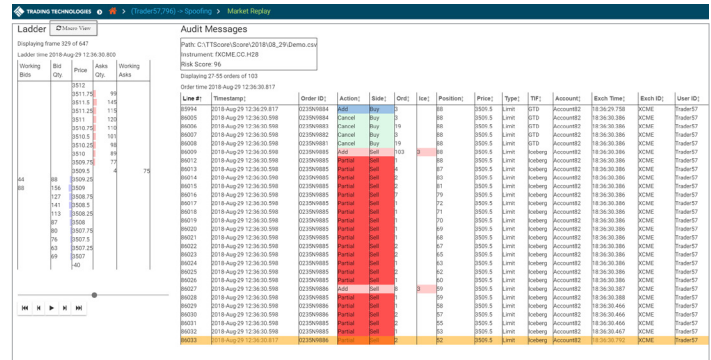
- ◆ TT Score's clustering algorithm segments order activity into "clusters" based on factors such as time, trader, instrument and proximity of other order actions.
- ◆ Each cluster is a slice of time in which the activity is likely related.
- ◆ Models are trained using data from actual regulatory cases and investigations.
- ◆ AI models that adapt over time remove the need for parameter-setting.
- ◆ Clusters are scored based on the degree of mathematical similarity to past regulatory actions.
- ◆ Scores range from 0 to 100 with higher scores indicating a greater similarity to known cases.



## VISUALIZE AND INVESTIGATE

TT Score facilitates the prioritization and analysis of post-processed trading data with an interface designed to handle big data and with unique visualizations that assist users in assessing and addressing risk.

- ◆ The Heatmap display highlights traders or accounts generating activity that has a high degree of similarity to regulatory cases.
- ◆ The Outlier chart displays every entity's percent of high-risk clusters compared to the total clusters on a single screen.
- ◆ Scorecard provides a summary of the vital statistics of a cluster as well as an initial visualization of the pattern that was formed by the order activity.
- ◆ Market Ladder Replay provides users with a frame-by-frame replay of the trading activity overlaid with Level 2 market data on a ladder-style interface.
- ◆ The Macro chart displays both the Level 2 market and the trader's data for the entire length of the cluster on a single screen.



**Audit Message**

Line #	Timestamp	Order ID	Action	Side	Qty	Price	Type	TPF	Account	Exec Time	Exec ID	User ID
80000	2018 Aug 29 12:36:30.800	022090884	Cancel	Buy	3	88	STO	AccountE2	18.36.30.800	KCME	Trader57	
80001	2018 Aug 29 12:36:30.800	022090884	Cancel	Buy	14	88	STO	AccountE2	18.36.30.800	KCME	Trader57	
80002	2018 Aug 29 12:36:30.800	022090882	Cancel	Buy	3	88	STO	AccountE2	18.36.30.800	KCME	Trader57	
80003	2018 Aug 29 12:36:30.800	022090881	Cancel	Buy	19	88	STO	AccountE2	18.36.30.800	KCME	Trader57	
80004	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	113	88	STO	AccountE2	18.36.30.800	KCME	Trader57	
80005	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	87	STO	AccountE2	18.36.30.800	KCME	Trader57	
80006	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80007	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	81	STO	AccountE2	18.36.30.800	KCME	Trader57	
80008	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	79	STO	AccountE2	18.36.30.800	KCME	Trader57	
80009	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80010	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	70	STO	AccountE2	18.36.30.800	KCME	Trader57	
80011	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80012	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80013	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	82	STO	AccountE2	18.36.30.800	KCME	Trader57	
80014	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80015	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80016	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80017	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80018	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80019	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80020	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80021	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80022	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80023	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80024	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80025	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80026	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80027	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80028	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80029	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80030	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80031	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80032	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	
80033	2018 Aug 29 12:36:30.800	022090885	Partial	Sell	2	80	STO	AccountE2	18.36.30.800	KCME	Trader57	



For more information about TT Score and a personalized demo, contact your local Trading Technologies representative or email [sales@tradingtechnologies.com](mailto:sales@tradingtechnologies.com).