

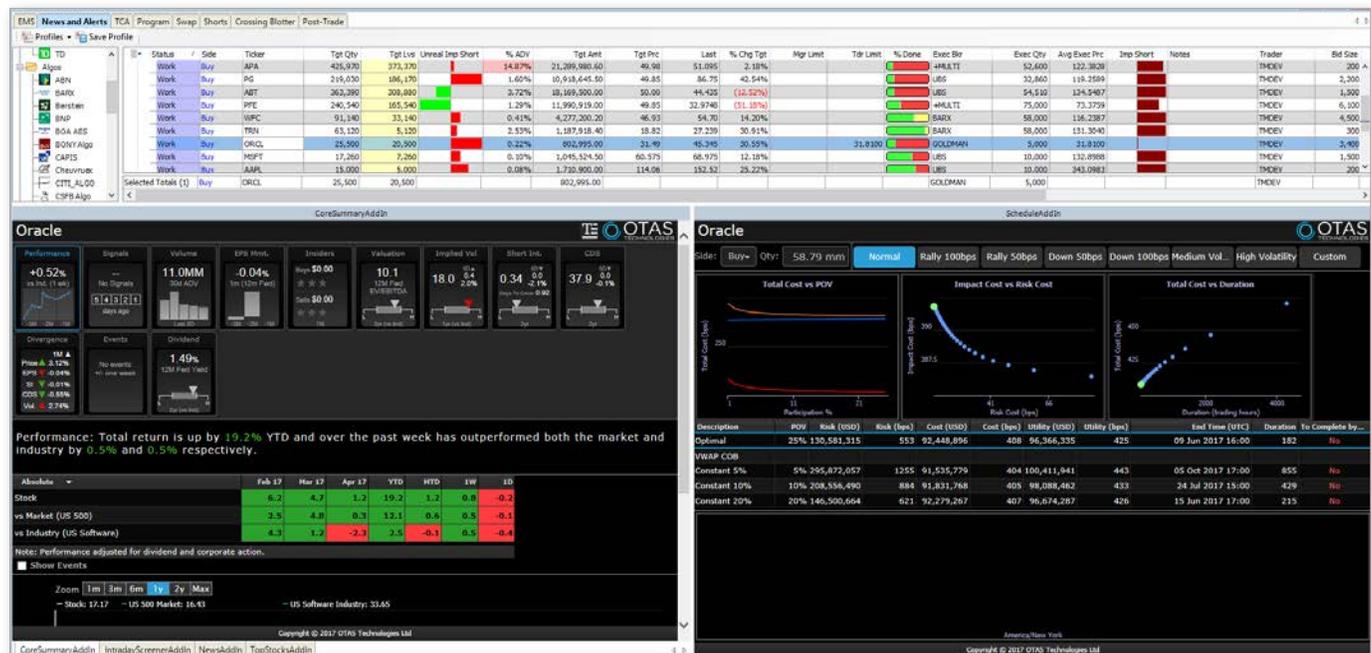
Trade Decision Support with OTAS Analytics in Charles River

OTAS global equity trading analytics helps improve trader efficiency by providing extensive decision support and data visualization capabilities directly within the Charles River Order and Execution Management System (OEMS).

OTAS applets provide traders with continuously updated and context-sensitive information for their orders, positions and securities. Adding OTAS applets to Charles River's OEMS improves trading decisions while ensuring transparency, auditability and regulatory reporting, helping traders minimize potential compliance violations. OTAS's trade analytics are available as a separately licensed add-in to Charles River's OEMS.

Traders use OTAS to:

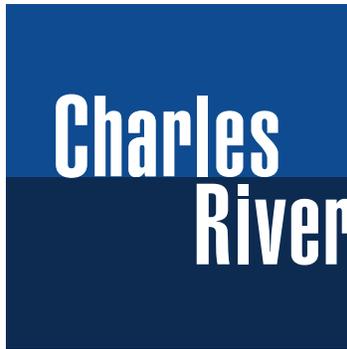
- Help minimize trading costs by determining when to speed up or slow down a trade
- Understand risk concentrations on their blotter or across the entire trading desk
- Receive notifications when OTAS detects off-exchange volume in their trades
- Trigger trade entry and exit signals based on a range of popular indicators



Context-sensitive OTAS Trading Analytics embedded in the Charles River OEMS help traders make more informed trading decisions and reduce transaction costs.

OTAS Trading Analytics Applets

- **Microstructure: Price:** Provides real-time comparisons of stock trading to expected and predicted values, covering price versus a basket of high correlated equities. **Volume:** Actual and predicted volume, liquidity at best bid and ask price, and breakdowns of volume between buyers and sellers.
- **Live Alert Panel:** Highlights exceptional occurrences in stock volume, return, liquidity and spread, helping traders adapt to changing market conditions.
- **The Optimal Schedule:** Provides a tailored trading profile for an individual equity, identifying when to increase participation and when to remain passive. The charts produced by the applet show recommended participation rates by time of day, and update dynamically to changing market conditions.
- **Intrade Performance:** Traders can benchmark their in-trade performance, using Price Weighted Participation, VWAP, and Arrival Price.



A State Street Company

ABOUT CHARLES RIVER

Investment firms, asset owners, wealth managers, hedge funds and insurers in more than 30 countries rely on Charles River's front and middle office investment management platform to manage more than US\$30 Trillion in assets. Together with State Street's middle and back office capabilities, Charles River's software technology forms the foundation of State Street AlphaSM. The Charles River Investment Management Solution (Charles River IMS) is designed to automate and simplify the institutional investment process across asset classes, from portfolio management and risk analytics through trading and post-trade settlement, with integrated compliance and managed data throughout. Charles River's growing partner ecosystem enables clients to seamlessly access external data and analytics, applications and liquidity venues that support the unique demands of their product and asset class mix. Headquartered in Burlington, Massachusetts, we serve clients globally with more than 975 employees in 11 regional offices. (Statistics as of October 2019)

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