

Charles River Trader

Multi-Asset Order and Execution Management

Charles River IMS provides a comprehensive Order and Execution Management System (**OEMS**) seamlessly integrated with data, FIX connectivity, and trade analytics. Extensive trade decision support capabilities help traders find liquidity, execute trades across all asset classes and currencies, and helps ensure trades are compliant.

One Solution for the Entire Trade Lifecycle

By combining OMS and EMS functionality, Charles River provides the tools traders need to work more productively from a single trade blotter. Traders can manage trade execution strategies, streamline complex workflows into “one-click” execution, act on an entire program as if acting on a single order, and monitor market data and security updates for active orders.

Charles River IMS eliminates the multiple interfaces, fragmented workflows, and order staging problems inherent in utilizing separate order and execution management platforms. Traders no longer have to switch between systems or re-key critical information, helping save time and reduce errors. Benefits beyond the trading desk include improved compliance and auditing, reduced operational risk, and simpler infrastructure.

The OEMS provides a real-time dashboard for managing daily trading operations, workflows and execution. Dynamic trade blotter columns visually show real-time data changes — execution status, order status and gain/loss — via color and magnitude displays. Within the blotter, traders can import orders from spreadsheets or files.

Tight integration with **Charles River Compliance** allows traders to monitor compliance across the entire trade lifecycle. Users can reduce errors and risk by identifying potential issues before a trade is executed. Advanced FIX auto-routing evaluates order characteristics, real-time market data, and pre-trade TCA calculations, enabling intelligent order routing to preferred venues and brokers. Trader also includes an order classification/trade automation engine to allow firms to categorize assets for more effective distribution of trading engagement, and auto-routing capabilities to allow lower touch orders to proceed to execution hands-free.

Benefits

- Supports collaboration between portfolio managers and traders
- Multi-Asset OEMS provides both core trading foundational elements and curated asset class coverage.
- Automation and streamlined operations allow traders to focus their attention where it's needed

Integration with Portfolio Management Activities

Charles River's OEMS offering connects the trader and portfolio manager through a shared platform. Full integration with portfolio management functions helps enable better communication between traders and portfolio managers by allowing portfolio managers to monitor the status of their orders in real time.

Global Connectivity

The Charles River Network enables fast and reliable direct access between buy-side clients and sell-side brokers. It supports global electronic trading via FIX, provides access to over 700 global liquidity venues and enables broker neutral, low-latency connectivity to all major trading destinations worldwide.

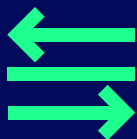
Traders can quickly send orders directly from the blotter to multi-broker trading venues, crossing networks, broker algorithms, program desks, alternative trading systems, dark pools, and smart routers. Connections are certified, tested and monitored by dedicated Charles River Network operations teams.

Charles River offers clients complete FIX software administration, connectivity management and support for each sell-side broker and trading destination. These services help eliminate the need for client FIX network administration and increase network reliability through continuous monitoring and ongoing testing and certification.

Shared Views for Portfolio Managers and Traders

- Real-time shared view of the order blotter with trading
- Event-driven market data and order alerts
- Next-gen visualizations
- Fixed income price discovery and data aggregation

FIX Network Highlights



Reliable point-to-point connectivity



Seamless access to both broker cash desks and algorithms ECNs, ATs, fixed income, and FX venues



Monitor IOIs, fills, real-time pricing, trade, and end-to-end connectivity status

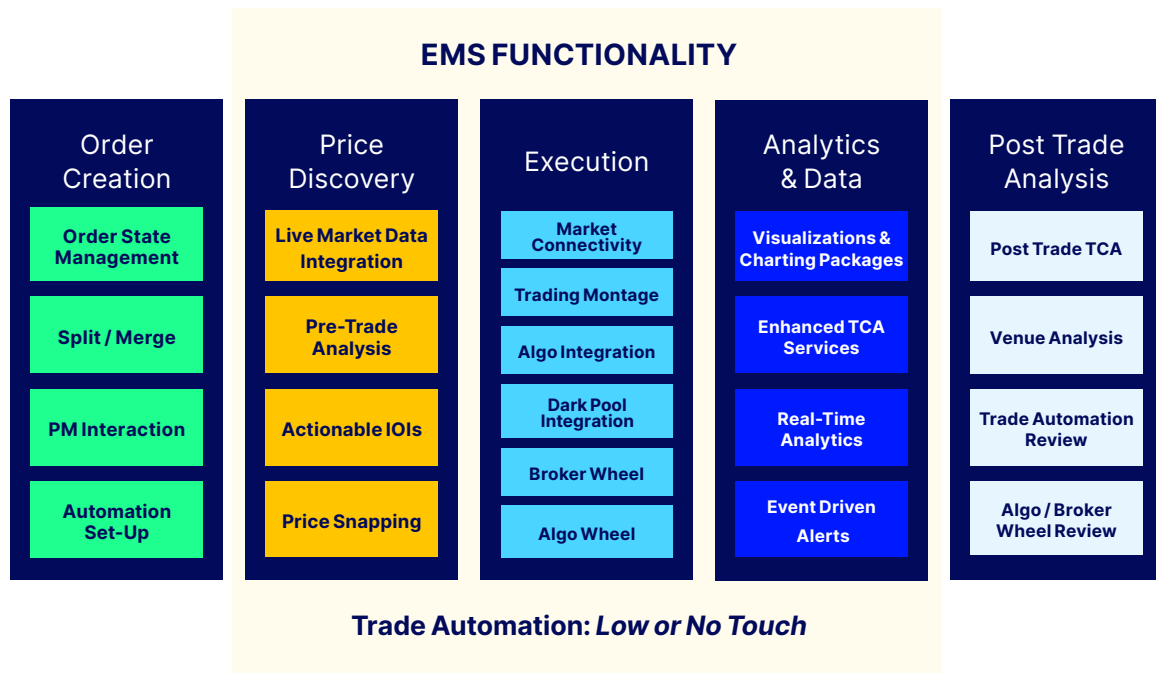


Connect via dedicated telecommunication infrastructure

Statistics as of July 2023

Execution Management Capabilities

Our Execution Management framework is linked to both our core order management functions and leverages Charles River's open API capabilities to connect with our 900+ partners in our expanded ecosystem.



Execution Management Highlights

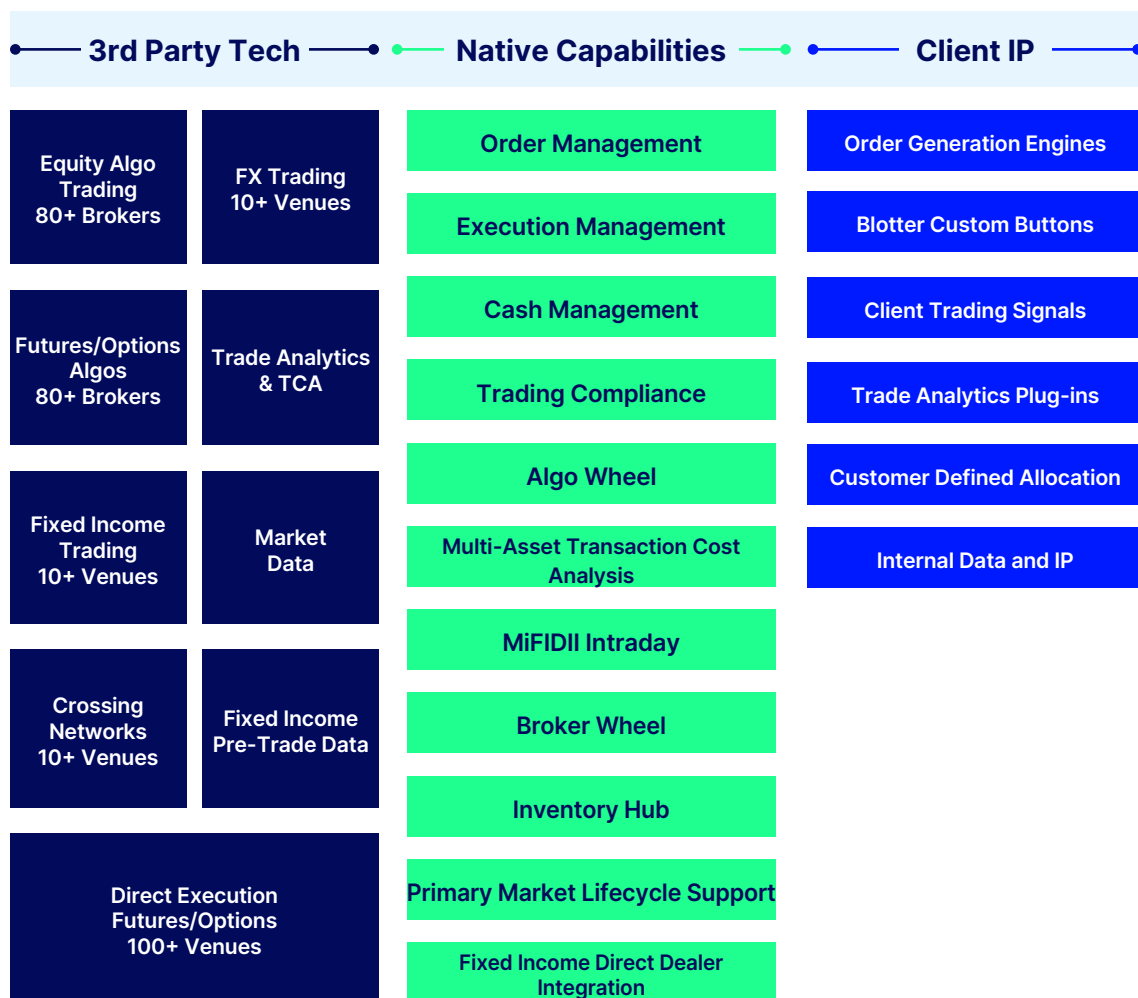


- Algorithmic Trading Integration
- Automated Order Routing and Broker Wheel
- Integrated Watch Lists
- Interactive Level I, Level II Display
- Price Snapping
- Integrated Pre-trade, In-trade
- Post-Trade TCA Program & List Trading Support
- Direct Sell-Side Integration
- Short Locate

Statistics as of July 2023

Charles River Trading Ecosystem

Charles River's order and execution management ecosystem significantly extends native OEMS functionality, enabling firms to seamlessly access their preferred liquidity venues, transaction cost analysis (TCA) and application providers directly from Charles River IMS. Our order classification and trade automation engine allows firms to categorize assets for more effective distribution of trading engagement. Auto-routing capabilities allow lower-touch orders proceed to execution efficiently. Clients can also source internally produced algos, data and analytics to help meet the unique demands of their investment process and asset mix.



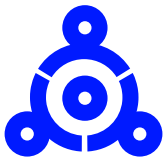
Statistics as of July 2023

One Platform for all Asset Classes



Equities

- Manage orders based on country, level of liquidity and estimated cost impact
- Auto route low touch orders
- Monitor intra-day implementation shortfall in real-time via gain/loss indicators and program slippage screens
- Configurable Broker Wheel functionality
- List/portfolio trading enabled
- Enable IOIs, dark pools and integration with block trading and crossing systems



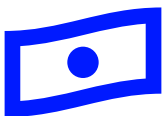
Broker Wheel

- Selects the execution broker and strategy from a list of execution destinations
- Supports equities, futures, options, and fixed income orders
- Configure multiple wheels, with either brokers or execution algos as members of a broker wheel
- Specify either equal (random) or custom weighted options for selection methodology
- Leverage Approved/Restricted broker rules and specify the number of times the broker wheel will re-spin to find a valid destination, when funds are restricted from certain brokers



Fixed Income

- Best in Class Price Discovery & Data Aggregation, including trade data such as MSRB, TRACE, Inventory/Axes from Neptune, Tradeweb, MarketAxess and Direct Dealers
- Streamlined new issue workflows via certified interfaces with S&P InvestorAccess, DirectBooks, Liquidnet, and Tradeweb
- Enable order routing decisions based on Fixed Income specific execution analysis metrics
- Connectivity to all major venues, and aggregates quote and inventory data on a centralized platform
- End to end syndicated loans functionality



FX/Cash Management

- Efficient FX and Cash management functionality
- Embedded cash ladder and forecast functionality
- Integrates with leading global FX execution venues including FXall, FX Connect® and 360T
- Auto FX enables easy currency risk hedging
- Easily manage FX forward rolls
- Utilize FX algos for automated execution

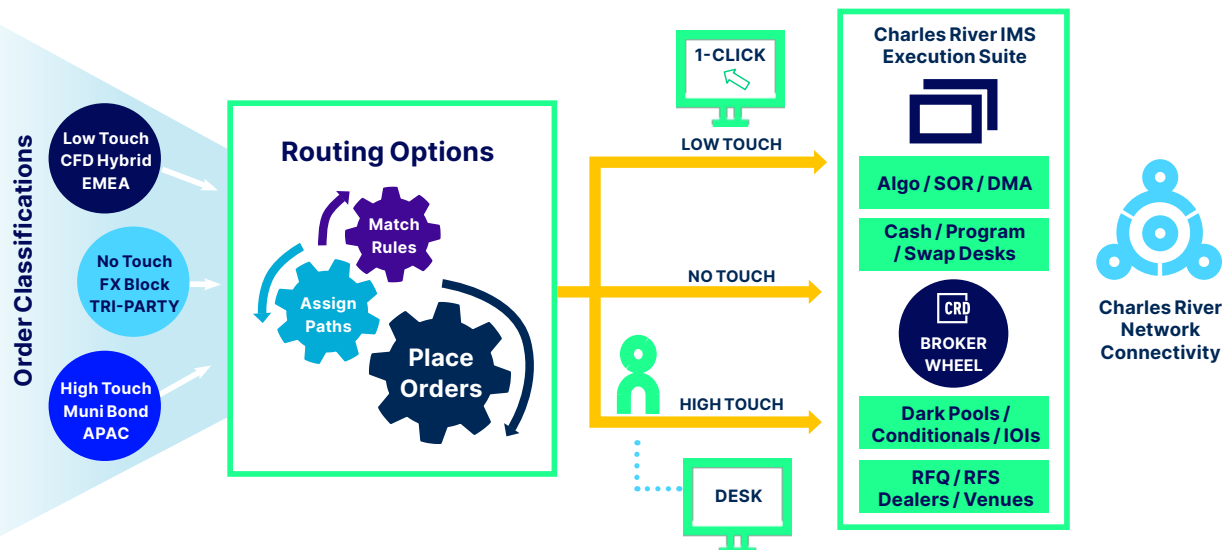
One Platform for all Asset Classes *(Continued)*



Derivatives

- Broad OTC instrument coverage and set up
- SEF connectivity to Tradeweb and Bloomberg
- Leverage embedded swap valuation and analytics
- Listed Derivative embedded market data
- Advanced sell-side listed derivative connectivity to brokers and venue

Trade Automation and Routing



Automation & Classification Framework

- Evaluate order characteristics, market conditions and/or pre-trade TCA information to help automate workflows
- Multi-asset classification engine
- Supports broad set of attributes for classification – Order, Security, and external data.
- Seamless integration with Auto Routing and Broker Wheel
- Use order classification rules and and/or auto-routing rules using criteria such as order size or % ADV to route orders to a specific wheel

Charles River Development, A State Street Company

Investment and wealth managers, asset owners and insurers in over 30 countries rely on Charles River IMS to manage USD \$59 Trillion in assets. Together with State Street's middle and back office services, Charles River's cloud-based front office technology forms the foundation of State Street Alpha®.

Charles River helps automate and simplify the 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 partner ecosystem enables clients to access the data, analytics, application and liquidity providers that support their product and asset class mix.

With more than 120% increase in headcount over the last 5 years, Charles River serves clients in 11 regional offices.

(Statistics as of Q4 2023. Assets are inclusive of clients using the platform for purposes of secondary compliance.)

Learn more at crd.com/trading

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