



# Tools for Portfolio Optimization and Risk Analytics in Charles River IMS

In combination with Charles River's portfolio management, risk and attribution capabilities, Qontigo's portfolio construction tools, in addition to equity, fixed income and multi-asset factor risk models and analytics, helps enable firms to identify, measure and model risk across the front and middle office on one platform. The Axioma Portfolio Optimizer™ incorporates several patented innovations that allow clients to build and rebalance more robust portfolios across a broad range of strategies and timeframes.

Leveraging Charles River's single data model and portfolio manager workbench, Qontigo's analytics tools provide global investment managers, asset owners, insurers, wealth managers and hedge funds with fit-for-purpose analytics across assets, markets and geographies.

## Qontigo's Analytics Tools in Charles River IMS

<b>Axioma Equity Factor Risk Model Suite</b>	<ul style="list-style-type: none"><li>• Fundamental, statistical and macroeconomic models updated daily</li><li>• Multiple methodologies provide different ways to combine insights and drivers of risk</li><li>• Multiple horizons (short and medium) to balance investment horizons and compare results with different forecasting assumptions</li><li>• Models customized through the Axioma Risk Model Machine can be integrated into Charles River IMS</li><li>• Transparent factors and robust statistics maintained by experienced researchers</li></ul>
<b>Axioma Portfolio Optimizer™</b>	<ul style="list-style-type: none"><li>• Flexible objective function and constraint library allowing users to tailor strategies to their own investment process</li><li>• Choose any combination of Axioma Factor Risk Models and/or third-party and internal risk models for portfolio construction</li><li>• Incorporate Charles River compliance rules as constraints, including security exclusions, restrictions and category limits</li></ul>
<b>Axioma Fixed Income and Multi-Asset Risk Models</b>	<ul style="list-style-type: none"><li>• Gain more granular and accurate views of entity-specific risk</li><li>• Measure and monitor risk budgets</li><li>• Validate risk assumptions for exposures across similar sectors/ratings</li><li>• Deconstruct portfolio risk at any required level of granularity</li><li>• Model corporate and non-corporate credit risk across portfolio</li></ul>

Charles River clients can access new capabilities and improved workflows across portfolio construction, risk monitoring and measurement and performance attribution.



Monitor risk in fast changing markets with short and medium horizon models

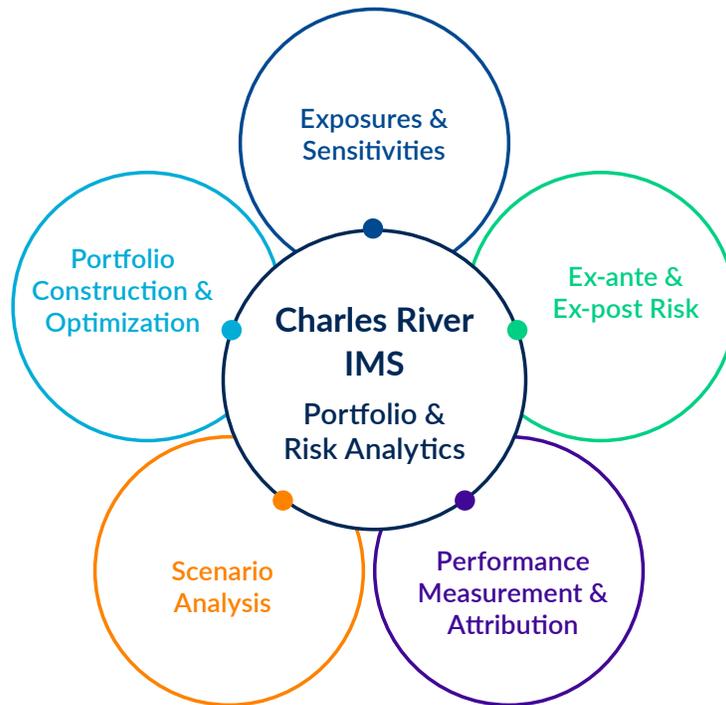


Utilizing Pure Factor Portfolios (PFP) to track factor performance, model portfolios for factor baskets, evaluate hedges and decompose intraday asset P & L



Analyze macro factors and stress test impact of macro events on portfolios

These capabilities support a broad range of investment strategies, products and tax objectives.



Investment Strategy	Benefit
Actively managed strategies	<ul style="list-style-type: none"> <li>Control portfolio exposures using standard or custom factor exposures in order to deliver results aligned with strategy objectives</li> <li>Construct more efficient portfolios by allocating risk to the factors that portfolio managers believe will outperform, while mitigating undesirable risk exposures</li> </ul>
Long/short portfolios	<ul style="list-style-type: none"> <li>Manage unwanted exposure by constructing efficient overlays</li> <li>Isolate risk factors and implement appropriate strategies including factor hedging or pair trading</li> </ul>
Index-tracking portfolios account replication & tax-efficient strategies	<ul style="list-style-type: none"> <li>Evaluate and report forecasted tracking error simultaneously</li> <li>Leverage multiple risk models to help minimize tracking error</li> <li>Construct smart beta strategies that closely track benchmark exposures</li> </ul>

## Qontigo — Optimizing Impact™

Qontigo is a leading global provider of innovative index, analytics and risk solutions that optimize investment impact. As the shift toward sustainable investing accelerates, Qontigo enables its clients—financial-products issuers, asset owners and asset managers—to deliver sophisticated and targeted solutions at scale to meet the increasingly demanding and unique sustainability goals of investors worldwide. Qontigo's solutions are enhanced by both our collaborative, customer-centric culture, which allows us to create tailored solutions for our clients, and our open architecture and modern technology that efficiently integrate with our clients' processes. Part of the Deutsche Börse Group, Qontigo was created in 2019 through the combination of Axioma, DAX and STOXX. Headquartered in Eschborn, Germany, Qontigo's global presence includes offices in New York, London, Zug and Hong Kong. Learn more at [www.qontigo.com](http://www.qontigo.com).

## Charles River Development, A State Street Company

Investment, wealth and alternative managers, asset owners and insurers in 30 countries rely on Charles River IMS to manage USD \$36 Trillion in assets. Together with State Street's middle and back office services, Charles River's cloud-deployed front [and middle] 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. We serve clients globally with more than 1,000 employees in 11 regional offices. Learn more at [www.crd.com](http://www.crd.com)

(Statistics as of Q4 2021)

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