

# Marketcetera™ System Architecture

## A Flexible and Efficient Architecture for Automated Trading

### KEY BENEFITS:

- **AGILE:** Open Source approach provides the agility to react quickly to the market and the flexibility to develop a trading solution focused on your unique investment strategies
- **INNOVATIVE:** Create, automate, and scale proprietary strategies effectively & efficiently across the entire trading lifecycle
- **SAFE:** Supported software licenses safeguard operational confidence and compliance

### SUPPORTED STANDARDS:

- **User Interface:** Eclipse RCP (Rich Client Platform)
- **Message Bus:** Apache ActiveMQ message broker
- **Security:** JAAS (Java Authentication and Authorization Service)
- **Persistence:** JPA (Java Persistence API)
- **Data Storage:** RDBMS
- **System Monitoring:** JMX (Java Management Extensions)
- **Brokerage Connections:** QuickFIX/J for FIX (Financial Information eXchange) connections

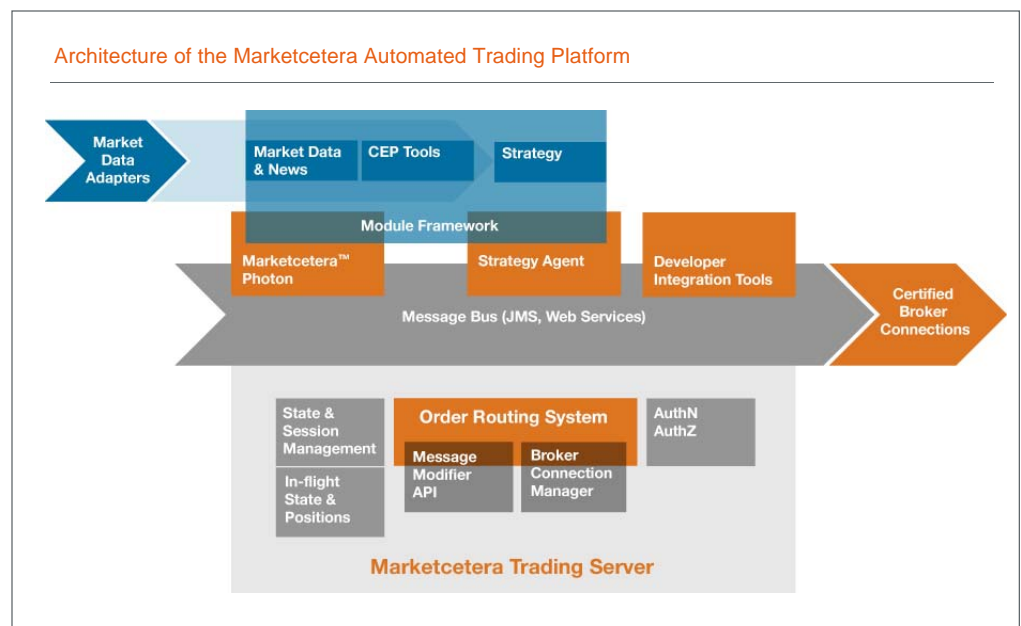
Modern trading environments require agility and adaptability in the face of rapidly changing conditions. In response to this need, Marketcetera presents the Marketcetera Automated Trading Platform, an open source platform that gives you the speed, power, and flexibility you need to respond to anything the market presents.

Designed for rapid deployment, Marketcetera's Automated Trading Platform is the only front-office solution offering an integrated approach across the entire investment cycle. A first in the industry, Marketcetera's innovative products fully automate and integrate market data, analysis, and trading execution with your proprietary pricing logic, freeing you from software development and maintenance to focus on your most valuable assets, your investment strategies.

The Marketcetera Automated Trading Platform is a standards-based open source software platform, with commercial supported software licenses available for firms requiring greater operational assurance. Our Open Source approach gives you total control over your trading platform at a fraction of the cost of proprietary commercial software or in-house solutions. And with a supported software license, you'll have the reliable support and access to Marketcetera technical resources needed to meet operational demands and compliance mandates, or simply for peace of mind.

### THE MARKETCETERA AUTOMATED TRADING PLATFORM

The Marketcetera Automated Trading Platform provides the secure, flexible, and robust software architecture required for automated and algorithmic trading.



Built as a modular framework, the tightly integrated components of the Marketcetera Automated Trading Platform provide an automated front-office solution for your trading needs. Components include:

**Module Framework:** The Marketcetera Module Framework and associated modules enable you to fully automate your trading strategies. Interfacing with the Market Data Adapter to stream market data and news, the Framework uses complex event processing (CEP) tools to filter and analyze this information before delivering it to the Strategy module. Your custom investment strategy logic is integrated into the Strategy via our Strategy API, which then executes against the information stream to yield trading decisions executed in the MTS.

**Photon:** Photon, our versatile end-user application, delivers critical trading capabilities via an easy-to-use graphical user interface or through an efficient command line interface. Tightly integrated with the Module Framework, Photon also provides a fully integrated strategy scripting facility that supports both Java and the Ruby scripting language. Additionally, Photon integrates seamlessly with MTS, ensuring that the information requests and orders generated by your strategies are executed efficiently and transparently.

**Strategy Agents:** Once your strategy logic is developed and tested in Photon or in your proprietary program, package and run it as a fully automated "headless" strategy or Strategy Agent. Using Java libraries provided by Marketcetera, Strategy Agents encapsulate your proprietary pricing logic with the functionality of Marketcetera's Module Framework modules into an independent program, providing the performance you need to scale strategies in the market. Once running, monitor your Strategy Agent's actions in Photon.

**Marketcetera™ Trading Server:** Efficiently and transparently execute orders and decisions made by strategies created in Photon or by Strategy Agents with the Marketcetera Trading Server (MTS). MTS manages all system communications regarding orders, broker connections, and more, ensuring your strategies are executed quickly, correctly, and efficiently. Enhancing your ability to control and modify your system, our Message Modifier API provides streamlined integration points to and from the MTS to add logic for pre-trade compliance and risk management. Additionally, MTS ensures security and confidentiality of your system by authenticating end-users and applications through Java Authentication and Authorization Service (JAAS) on your secure network.

**Market Data Adapters and Certified Broker Connectors:** Translate third-party data formats into the Marketcetera format and seamlessly integrate proprietary market data for use by your Strategy with our Market Data Adapters. Current Market Data Adapters support the integration of OpenTick, ACTIV and other FIX-based data feeds. We also provide Certified Broker Connections, allowing you to tie your trading system to one or more sell-side brokers for transparent order placement.

**Developer Integration Tools:** Marketcetera provides an array of Developer Integration Tools to leverage the Marketcetera solution, rapidly develop and deploy your unique investment strategies, and speed any necessary internal system integration. Tools include a bulk Order Loader utilizing .csv file formats, a .NET client component for the direct integration of Excel or C# applications, and supported Application Programming Interfaces (APIs) including the Message Modifier API and the Strategy API.

## SOFTWARE REQUIREMENTS

### Server Software Requirements:

- *Operating System:*  
Ubuntu 8.x Linux
- Uses Java/JRE (version 1.6) and MySQL version 5.0.5 Community edition

### Client Software Requirements:

- *Operating System:* Desktop version of Windows XP, Windows Vista, Ubuntu 8.x Linux
- Photon and OrderLoader Clients also use Java/JRE (version 1.6)
- .Net Client client uses Visual Studio 2008/2005 Runtime Env

## HARDWARE REQUIREMENTS:

### Minimum Client Desktop Requirements:

- Pentium D minimum 3GHz, 1 CPU, minimum 2GB RAM, minimum 20GB Disk

### Minimum Server Configuration:

- Pentium D 3GHz+, 1 CPU, 4GB+ RAM, 200GB+ Disk

The configurations below are recommended for typical larger scale deployments:

- Xeon 2GHz+, minimum 2 CPUs, minimum 8GB RAM, minimum 200GB Disk; recommend RAID 5+ disk array

Optimal hardware requirements depend on expected user numbers, data sizes, usage patterns, real time market data, strategy, and related calculations.



**Marketcetera** is the leading provider of open source software for automated trading systems. Portfolio managers can quickly transform trading ideas and pricing rules into their own proprietary algorithms that are embedded in the Marketcetera platform. The open source foundation of the platform provides maximum agility and technology choice to institutions of all sizes.

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