

ORDER MANAGEMENT SYSTEMS

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INTRODUCTION

Order management systems (OMSs) have become an integral part of a trader's workflow and have become increasingly more entrenched on trading desks.

Historically, order management systems have focused on automating internal communications, allowing traders to electronically collect orders and instructions from portfolio managers, aggregate orders into blocks, manage executions, collect fills and allocate to several different accounts. Today, however, OMSs are enhancing their functionality by providing advanced trading tools including analytics and reporting, access to multiple brokers and execution venues, algorithmic routing capabilities and advanced execution functionality available through direct market access (DMA) platforms and execution management systems (EMSs).

The following report provides information on the many components of an order management system, trends in the industry and information to consider when purchasing an OMS.

COMPONENTS OF AN ORDER MANAGEMENT SYSTEM

With order management systems being the central integration of front, middle and back office functions, it is important to understand the components of an OMS and how their functionality can add value to your business model.

The primary functions of an order management system are portfolio management, trade analysis, reporting, trade execution, trade management, compliance tracking and FIX connectivity. Each component plays an important role.

Portfolio Management

Typically, portfolio managers use a portfolio modeling module to construct, analyze, rebalance and run "what if" scenarios. This simulation process shows the risk and liquidity effects of potential changes in the portfolio. Once a trading decision is made, the portfolio manager will authorize the trade and send it electronically to a trader.

Compliance

The compliance module determines if trades meet compliance policies. Some additional benefits provided by a compliance module include post-execution monitoring, audit trails and compliance administration. With tough industry regulation, compliance tops the operational priority lists of many firms.

Trading

The trading module provides real-time, fully customizable trade blotters that communicate with portfolio managers, compliance, back office, brokers and a variety of execution venues.

FIX

The FIX module provides for real-time trade and indication of interest communication between the trader, brokers and execution venues. Financial Information eXchange (FIX) is the industry standard protocol for real-time exchange of transactions and information related to the securities markets.

Allocation

The last step in the order management process includes the confirmation and allocation of executed trades. Allocations are communicated to brokers via the phone, fax, OASYS or a direct FIX link.

ORDER ROUTING NETWORKS

Order routing networks are used to relay trading information between the order management system, brokers and execution venues. Order routing networks can be categorized into one of the following types:

Point-to-Point – Orders are sent over a network directly to each broker or execution venue.

Advantages

- Orders sent directly to brokers without passing through a third-party vendor
- Use of all FIX capabilities

Disadvantages

- Requires more IT involvement on the user's side
- Manager must monitor FIX connections with each broker
- Manager must test with each broker

Service Bureau (Protocol Conversion) – Orders are sent to the order routing network vendor who converts the order to the proper message format for each broker or execution venue.

Advantages

- Simple and quick to use
- Vendor handles all FIX testing
- Vendor monitors the communication line
- Vendor converts all messages for broker compatibility

Disadvantages

- FIX capabilities limited by the vendor
- System error can stop all electronic trading
- Service bureau “sees” your trading data

Some of the most common order routing network vendors include: Bloomberg, Reuters, ITG Net, NYFIX, SunGard, TNS, Thomson ATR, Linedata and Charles River.

TRADING TOOLS

Technological advances have made trading more efficient than ever. As order management systems continue to enhance their functionality, additional trading tools have become available.

Crossing Networks/Dark Pools

While crossing networks have been around for many years, it wasn't until recently that dark pools of liquidity have proliferated. It is estimated that there are nearly 40 dark pools available today including proprietary dark pools as well as those available to both the buy and sell-side.

Dark pools are electronic trading venues that do not publicly display quotes. Orders are matched anonymously, often at the midpoint price or through negotiation with a counter party, and are typically done with minimal market impact.

With the development of the numerous dark pools of liquidity, fragmentation has become a concern. To address this, many providers are linking directly with each other in addition to offering access to their liquidity through algorithms.

Because of their ability to impact the natural price discovery process of traditional markets, darks pools have drawn attention from regulators. A section of Regulation National Market System (Reg NMS) focuses specifically on dark pools and states that any trading venue accumulating more than 5% of US equity volume must provide open quotes to the broad market.

Algorithmic Trading

Algorithmic trading has become increasingly popular over the past several years. Algorithms enable traders to automate the execution of their orders by aligning them with specific trading strategies. Cost, market changes, fragmentation, declining liquidity, decimalization and the advancement of electronic trading technologies have all been drivers in the development of algorithmic trading.

Algorithms have evolved from time and volume based strategies to more adaptive strategies. Recent developments in algorithmic trading strategies include dark pool algorithms and portfolio algorithms that take into account an entire portfolio of securities.

Execution Management Systems

An execution management system (EMS) is a trading application that has the ability to manage orders across multiple trading destinations, in a wide range of asset classes. EMSs can be considered a next generation direct market access (DMA) platform.

Many EMSs offer advanced trading features including direct market access, algorithms and trading capabilities in global equities, options, futures and foreign exchange. EMSs are typically stronger in trading capabilities but lighter in many of the OMS functions. The EMS is more agile and can adapt more quickly than the OMS in today's rapidly changing capital markets, and some firms may find their abilities to be more valuable and practical for their needs.

INDUSTRY TRENDS

EMS vs. OMS

One of the biggest trends is the concept of a globally integrated OMS and EMS. Surging market data volume is creating a demand for trading platforms that not only can handle increased data volume, but will also eliminate the hassles of dealing with two separate trade management systems.

While OMSs are integral for portfolio modeling, compliance and accounting, EMSs are great for active electronic trading across multiple asset classes and algorithmic strategies. With the buy-side's need for both sets of functionality, order management systems have been developing EMS functionality while execution management systems have been adding OMS functionality, thus causing a blurring of the line between the two systems.

Several recent EMS/OMS integrations include Linedata LongView and REDI, EzeCastle and BNY Convergenx, LatentZero and Fidessa EMS, and ITG and Macgregor.

Data Latency

Another trend on Wall Street that is capturing the time and attention of OMS providers is the movement to reduce data latency. Latency is the time it takes for data to move electronically from one place to another. Data is passed through countless network switches, market participants, servers and applications.

There are several methods to reduce transaction times. Enhancing technological infrastructure, buying data caching solutions, installing hardware accelerators and co-locating servers are among the most popular ways to reduce latency. Co-locating consists of a broker housing their algorithms and servers in the same room, or as closely as possible, to the actual servers of the exchanges and electronic markets. This process can eliminate even the most imminent time lags in the fastest area wide networks.

Industry Regulation

Industry regulation such as the SEC's Regulation National Market System (Reg NMS) has helped solidify the eminent role of electronic trading in the US equities market. The same can be said about Europe's Markets in Financial Instruments Directive (MiFID).

Best execution is not just desired by traders and money managers, it is now a regulatory factor that must be accounted for by both buy- and sell-side firms. The new regulation is heavily focused on electronic markets and investor protection, which has in turn had a great effect on the amount of electronic trading data produced. Compliance and regulatory factors have and will continue to influence the production of electronic trading systems and the overall electronic trading market.

CONSIDERATIONS WHEN PURCHASING AN OMS

Purchasing an OMS, or replacing an OMS, is a time-consuming effort that requires the involvement of numerous people and departments. Therefore, it is important to consider several different factors when beginning the OMS search process.

Product Price

Order management systems are either purchased or leased. Some vendors only offer one option while other vendors offer both. Purchasing a system usually entails a higher initial outlay of costs with monthly maintenance fees costing between 20-25% of the system price. Leased systems incur higher monthly premiums but come with a lower initial cost. Installation and integration costs are not usually included in the price of the system. Be sure to inquire about these costs.

Implementation Process

Implementation of an OMS often takes 3-6 months to complete depending on the complexity of the installation and the vendor's number of current or pending implementations. A good way to find out what the installation process involves is to contact other clients about their implementation experience.

Support

Some order management systems are complex and require the investment manager to have a sophisticated IT department. Be sure to balance the sophistication of your IT staff with the sophistication required by the order management system. For a fee, many of these vendors are willing to take on many of the IT requirements. Depending on the size and needs of your firm, some smaller vendors may not be able to provide the appropriate level of support required. Be sure to check client references on their ability to get support after the sale.

Third-Party Interfaces and Data Sharing

Firms need to think about how they will interact with the markets. Will they use crossing networks, algorithms, ECNs, EMSs, or simply use FIX to connect to traditional brokers?

For complete automation, a system must be integrated with a portfolio management system, execution venues, trust accounting system, risk management, and other systems that need trade data. Many of these connections have been built and are available for your use, but some connections must be developed. If a system does not currently have an interface, the vendor will offer to build one for a fee. Be aware that being a beta for a custom interface often involves a lot of time on the manager's part.

Transaction Cost Analysis Integration

Transaction cost analysis (TCA) tools analyze a firm's executions and compare them to specific benchmarks. The tools look at the executions by broker, by trader, and by other metrics to measure how the buy-side trader is performing. These analytics try to analyze market impact, compare trade execution to the portfolio manager's instructions, and examine the execution in conjunction with various portfolio or firm benchmarks.

The end result of TCA should be a scorecard that helps traders, portfolio managers, and the firm better understand their strategies and the impact the strategies have on performance.

CONCLUSION

Order management systems have evolved from a tool used to automate internal communications to a sophisticated system that has become an integral component on a trader's desktop. As OMSs strive to meet the demands of the buy-side, they will continue to enhance their systems with EMS functionality and vice versa. As a result, the line between the two will continue to blur.

While the task of implementing or replacing an order management system may seem daunting, CAPIS' electronic trading department is available to assist in your efforts. For more information on order management systems, please contact Kevin Phelan at 214-978-4713.

Advent Moxy
www.advent.com

O V E R V I E W

Moxy is licensed to bank trusts, asset managers, broker dealers, wrap sponsors, financial planners, hedge funds, mutual funds, family offices, and insurance companies.

The range of assets under management is from \$100 million to over \$40 billion, with the typical client having \$3 to \$5 billion in assets under management. Moxy is currently licensed at over 750 firms and has a presence in the US, Europe, Canada, Mexico, Australia and the Far East.

Moxy runs on Microsoft SQ Server 2005. The system requires Microsoft SQ Server 2005 on the server and Microsoft Windows XP on the workstation.

Advent Software, Inc. is a provider of Enterprise Investment Management solutions, offering stand-alone and client/server software products, data interfaces, and related services that automate and integrate mission-critical functions of investment management organizations. Advent has licensed its products to more than 6,000 financial institutions in 36 countries for use by more than 60,000 concurrent users. The company's common stock is traded on the NASDAQ National Market under the symbol ADVS. Moxy has an installed customer base of over 750 firms.

Advent Software employs over 850 individuals in offices in San Francisco, New York, Boston, and 10 European cities.

Advent has over 200 professionals on their professional services team who are dedicated to implementing clients and supporting larger clients for all Advent product offerings.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Client leases the license.</p> <p>A 10-user license ranges from \$70,000 to \$115,000.</p> <p>A 20-user license ranges from \$135,00 to \$220,000.</p> <p>A 40-user license ranges from \$260,000 to \$405,000.</p> <p>Maintenance currently runs from 15 to 20 percent of the current software price.</p> <p>The FIX module currently runs from \$20,000 to \$60,000.</p> <p>Annual term licenses also available.</p>	<p>Portfolio Modeling:</p> <ul style="list-style-type: none"> • Consolidated group trading, household modeling and allocation to efficiently rebalance families of accounts • Rebalance single portfolios or groups against models • View “what if” scenarios • Build models from existing accounts or indices • Balance entire portfolios or select asset classes, sectors, industry groups or security types <p>Compliance:</p> <ul style="list-style-type: none"> • Define restrictions for accounts based on security types, asset classes and industry and sector weightings • Define cash buffer requirements • Establish “hard” vs. “soft” restrictions for flexibility in the order creation process • Place restrictions on trading pledged securities <p>Trading:</p> <ul style="list-style-type: none"> • Standard FIX message types such as new order, single order, cancel/replace, execution reports, allocations, DK, and many others • Support for custom tags using fixed mapping, mapped values or derived values • Two-way FIX messaging as well as one-way or unsolicited trade requests (UTRS) • Currently support FIX 4.0 and 4.2 	<p>Portfolio Management: Clients most often use Advent's portfolio system, AxyS. Advent has several custom links to other portfolio accounting systems and is building more.</p> <p>Market Data: Advent offers supported real time pricing through an interface to FT Interactive Data and Telemet. Users have also linked real time pricing data into Moxy through other systems that can provide a feed to SQL Server.</p> <p>Custodian: Advent has current links with over 450 custodians. See www.advent.com for complete list.</p>	<p>Moxy has an installed customer base of over 750 firms.</p>

Antares
www.ssctec.com

O V E R V I E W

Antares is licensed to buy-side money managers including hedge funds, family offices, institutional asset managers, proprietary trading desks, short-term (money market) desks, pension funds and mutual funds.

The range of assets under management for an Antares client is from \$100 million for some of the smaller hedge funds, and up to \$75 billion for the larger asset managers. The typical Antares client has \$1 to \$10 billion in assets under management.

More than 75 clients use Antares to support their trade order management requirements.

SS&C Technologies, Inc., headquartered in Windsor, CT with offices throughout North America, Europe, Asia, and Australia, provides the global financial services industry with a broad range of highly specialized software, business process outsourcing (BPO) services and application service provider (ASP) solutions. SS&C delivers mission-critical processing for information management, analysis, trading, accounting, reporting and compliance. Products and services are provided in eight vertical markets:

- Asset Management
- Alternative Investments
- Insurance & Pension Funds
- Financial Institutions
- Municipal Finance
- Real Estate Property Management
- Commercial Lending
- Corporate Treasury

SS&C has undertaken an ongoing effort to partner with a select group of complementary service, technology, and information providers that are interested in jointly servicing the financial services industry. The objective is to increase the overall level of quality and service and to improve communication and knowledge among the key industry influencers in this market. Specifically, SS&C seeks to align with the following types of organizations:

Global Strategic Partners - Consulting firms with multi-national, multi-industry support capabilities.

Industry Partners - Firms with acknowledged segment expertise within vertical applications for SS&C solutions.

Technology/Software Partners - Companies having technology and software that are complimentary to SS&C capabilities.

Data Providers - Companies providing information through SS&C software solutions that will help mutual clients.

Antares has an open database client/server (Sybase or MS SQL Server) architecture, which runs on Windows NT or UNIX.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Clients can purchase a perpetual license, arrange for a flexible-term lease, or the software can be delivered via an ASP model.</p> <p>Lease plans, which include maintenance, generally begin at \$5,000 per month for a three-year term.</p> <p>ASP model pricing, which includes maintenance, generally begins at \$7,500 per month.</p> <p>Standard pricing for a multiple-user license can range from \$75,000-\$250,000. The annual maintenance fee for license contracts is 20 percent of the initial software license fee.</p> <p>The license fee for more than 20 users is negotiable.</p>	<p>Portfolio Modeling:</p> <ul style="list-style-type: none"> Standard set of fixed income and equity trading models and other “what if” analysis tools. Users may also create custom models An unlimited number of portfolios may be modeled at once <p>Compliance: <u>ComplianceMonitor</u></p> <ul style="list-style-type: none"> Supports full pre- and post-trade compliance at multiple levels and is fully integrated with Antares Features hard and soft restrictions Notification of compliance status available at any stage in trade process with complete audit trails <p>Trading: Antares accommodates numerous asset types including equities, fixed income, derivatives, and repurchase agreements, all in a complete multi-currency environment.</p> <p>Distinctive trade functionality includes:</p> <ul style="list-style-type: none"> Specific tax lot trading Bulk trade processing Full step-out and commission support FIX compliant for electronic trade routing and notification <p>Data Visualization: Heatmaps are designed to acquire, analyze, navigate and present large amounts of real-time and proprietary data.</p>	<p>Portfolio Management: Antares currently interfaces with many back-office accounting systems including SS&C’s CAMRA, Advisorware and Total Return, and Advent’s Axys. SS&C will design additional interfaces as needed.</p> <p>Market Data: Real-time pricing of securities available from major market data providers including FT Interactive, Bloomberg, Reuters, PC Quote, TIB, Baseline.</p> <p>Custodian/Prime Broker: Antares currently has custom interfaces with Goldman Sachs, Bear Stearns and Morgan Stanley. A generic interface that is widely adaptable is also available.</p> <p>Other: Omgeo (DTC, OASYS), Instinet, OASYS Global, AutEx, TradeRoute Network, Bloomberg Crystal Reports for custom report development</p> <p>FIX Network: Antares is certified with multiple FIX networks including NYFIX and Autex for access to over 500 destinations for liquidity.</p>	<p>Antares evolved from an order management system first developed by Shepro Braun, a firm acquired by SS&C in 1997.</p> <p>SS&C offers a straight-through processing solution with Antares and its portfolio management system offerings such as CAMRA, Advisorware, and Total Return.</p> <p>XE (Cross Enterprise) application platform communicates events, such as approved trades, between Antares trade order management and modeling system and CAMRA. The result is a delivery of accurate, real-time information from external straight through front, middle, and back office systems – without human intervention.</p> <p>Utilizing XML-based messages and Microsoft Corporation’s MSMQ messaging services, XE is paving the road toward instantaneous transaction processing. The XE application platform delivers XML messages across a wide-area networks or virtual private network on the Internet. Each XML message is its own metadata repository containing both structured and unstructured data, including workflow instructions, content, and schema description.</p> <p>Current and future Antares development is focused around FIX, modeling and derivatives integration.</p>

Bloomberg Portfolio Order Management System

www.bloomberg.com

O V E R V I E W

The Bloomberg Portfolio Order Management System is used by money managers, investment advisors, pension funds, mutual funds, state agencies, bank trust departments and insurance companies. Bloomberg POMS is employed by both fixed income and equity clients and has global product coverage. POMS is a multi-asset class system including fixed income, equities, futures, options and derivatives.

Currently, POMS is employed at over 350 buy-side firms globally. The range of assets under management is from \$20 million to \$500 billion, with the typical POMS client having between \$5 and \$50 billion in assets under management. Bloomberg's offering in the alternative investment space, POMS-AI, expands on the core offering by also providing tools for strategy position management and prime broker relations. A typical AI client has between \$500 million to \$1 billion AUM.

Bloomberg POMS customers have their own secure encrypted database housing account and position data. The databases are built and maintained by Bloomberg. The Bloomberg POMS' applications run on the same platform as the Bloomberg Professional Service and are provided in an ASP model. Real-time and batch trade, Security Master, and customizable data feeds are sent TCP/IP and FTP.

The Bloomberg POMS has a dedicated programming, development, support, and sales staff. Bloomberg POMS provides 24/7 global product support. All support is inclusive of the OMS cost.

Bloomberg L.P., founded in 1981, provides news, pricing and analytics via the Bloomberg Professional Service to over 210,000 dedicated desktop terminals globally. Bloomberg POMS is a suite of front-end trade order management and compliance applications offered over the Bloomberg Professional Service.

Bloomberg has forged a unique position within the financial services industry by providing a range of features in a single package, the Bloomberg Professional service. By addressing the demand for investment performance and efficiency through a combination of information, analytic, electronic trading and straight through processing tools, Bloomberg has built a worldwide customer base of corporations, issuers, financial intermediaries, and institutional investors. In addition to providing the Bloomberg Professional service, the company has global news, television, radio, Internet, magazine and book publishing operations.

Bloomberg, headquartered in New York, has over 8,000 employees globally, in over 126 countries with 108 regional offices worldwide.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Client leases license.</p> <p>POMS pricing structure revolves around using the Bloomberg Professional Service as the central application for straight through processing.</p> <p>For US clients, POMS is \$100,000 annually. The POMS-AI platform is \$125,000 annually. Front-end software, implementation of trading system, training, related data feeds including Master Security data, and the Bloomberg Gateway are included within the pricing structure.</p> <p>Each professional accessing the POMS suite of applications is required to have their own Bloomberg Anywhere subscription. Considerations are made for operations users.</p> <p>Bloomberg's Gateway software facilitates the integration of POMS data feeds into back-office systems and other downstream applications. POMS/AIM also has direct links with custodians and prime brokers.</p> <p>Bloomberg POMS' clients can take advantage of Bloomberg's global FIX network for routing equity orders to brokers. Bloomberg maintains over 1,000 FIX connections globally.</p>	<p>Position Management:</p> <ul style="list-style-type: none"> Ability to rebalance against a benchmark and/or other models Real-time position monitoring Comprehensive on-line reporting and scenario analysis (Crystal Report viewer included) <p>Compliance: POMS compliance leverages Bloomberg's security data to seamlessly integrate multiple pre- and post-trade compliance checks.</p> <p>Trading:</p> <ul style="list-style-type: none"> Minimum exposure to errors because all trades are captured electronically Integrated with Bloomberg Global FIX Network, ECNs, and fixed income trading platforms as well as MarketAxess, Tradeweb, Bloomberg Tradebook, Bloomberg Fixed Income electronic trading applications and Liquidnet Trade files are sent to back office on a real-time and/or batch basis <p>Client Site Integration Services:</p> <ul style="list-style-type: none"> Software license and support for data and communication management Custom data mapping Project management and consulting services 	<p>Risk: Access to Algorithmics' advanced simulation engine and sophisticated risk analytics is pre-integrated.</p> <p>Market Data: Bloomberg</p> <p>Custodians: Deutsche Trust Existing links include: Bankers Trust Bank of New York Brown Brothers Harriman IBT (Investors Bank & Trust) State Street Bank & Trust Chase Manhattan Bank Northern Trust Citibank Citibank Tokyo Citibank HK Citibank Lux Citibank Nikko Trust Mellon Bank Mellon Bank of London Morgan Stanley RBC US Bank</p> <p>Accounting: Data interfaces with all industry leading accounting systems (PAM, Portia, Camra, AxyS, etc.).</p> <p>Settlement Connectivity: Direct interface to Omgeo OASYS 4.0, which provides investment managers with real-time central matching of allocations to confirmations.</p>	<p>Bloomberg Portfolio Order Management System provides extensive analytics news and quote data.</p> <p>Bloomberg acts as a conduit between the buy-side and sell-side through Bloomberg's proprietary order routing network via FIX or other computer-to-computer interfaces.</p> <p>Bloomberg has integrated their full market data service with straight-through processing tools to seamlessly integrate news, analysis, electronic trading, back office interfaces, and data and communication management on a single vendor platform.</p> <p>Bloomberg offers an integrated equity attribution system as part of POMS. Industry standard attribution models are used to evaluate fund performance, evaluate active returns made or lost based on allocation, selection, and currency effects.</p> <p>Bloomberg in conjunction with Algorithmics offers portfolio risk analytics centered around VAR, tracking error, and stress testing. VAR coverage includes scenario-based Monte Carlo and historical VAR methodologies.</p>

Charles River Investment Management System

www.crd.com

O V E R V I E W

The Charles River Investment Management System (Charles River IMS) is a comprehensive front- and middle-office software suite for all asset classes, including SWAPs and other derivatives, options, foreign exchange, fixed income and equities. The integrated, modular system provides complete trade-cycle support including: portfolio management and modeling; order management and electronic trading; real-time pre-trade and end-of-day compliance; and centralized management of trade matching, confirmation, and settlement workflow. Charles River IMS incorporates real-time electronic trading via FIX through the secure, private Charles River Network based on the BT Radianz global financial extranet. The N-Tier service oriented architecture (SOA) of Charles River IMS supports 24/7 global operations, and combines state-of-the-art and industry standard technologies to ensure an open, flexible system that is scalable, functionally rich, and easy-to-use and integrate. The company offers additional services, including managed and implementation services.

Charles River Development is an award-winning provider of technology systems and services for investment firms in the institutional, mutual fund, banking, hedge fund, wealth management, and insurance and pension industries. Charles River supports over 250 clients in 30 countries across six continents. Recognizing the strategic importance of local knowledge and experience to meet clients' needs, Charles River maintains headquarters in Boston with regional offices in London, Melbourne, Paris and Singapore.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Charles River Investment Management System is licensed on an annual basis. The annual lease fee includes the amortized license fee, maintenance/ support, and all software and documentation updates. Initial lease term is typically three years with client's option to extend annually thereafter.</p> <p>Charles River Trader and Charles River Manager are licensed as a function of named users.</p> <p>Charles River Compliance is licensed based on the size of the asset base monitored by the software. A significant discount applies when both products are licensed together since they are tightly integrated and there is functional overlap.</p> <p>Average licensing ranges from \$50,000-\$1,000,000+ annually.</p> <p>Support and maintenance are included in the monthly license fee. All major upgrades are provided at no additional charge to the client during the term of the agreement.</p> <p>Charles River IMS includes a market-leading FIX engine (at no additional charge) and connects to any FIX 4.0, 4.2 or FIX 4.4 compliant counterparty.</p>	<p>Portfolio Management: <u>Charles River Manager</u></p> <ul style="list-style-type: none"> Advanced multi-currency portfolio management tools Equity, fixed income and derivative modeling, security swapping, and "what if" analysis tools Cash forecasting and cash management Exposure-based trading and analysis <p>Compliance: <u>Charles River Compliance</u></p> <ul style="list-style-type: none"> Global compliance rule library with over 1,000 rules including US SEC 1940 Act, rule 2-A7, UK FSA, UCITS III, Canada, German KAGG, Hong Kong, Japan, and many others User-friendly, rule-building wizard Real-time monitoring of pre-trade, post-trade and portfolio-level compliance checks "What if" analysis to determine potential compliance issues pre-trade <p>Trading: <u>Charles River Trader</u></p> <ul style="list-style-type: none"> Supports all security types including equity, fixed income, money market, derivatives and currency Electronic trading and settlement with support for FIX, ECNs, ATSS, OASYS, and others. Charles River IMS supports equity and fixed income FIX allocations as well as FIX for FX trading Basket trading and slicing, program, list and algorithmic trading Comprehensive broker management functionality Comprehensive trade and commission reporting FIX connectivity with major ECNs, ATSS, TradeWeb, MarketAxess, FXall and more 	<p>Portfolio Management: <u>Accounting System Interfaces</u> Advent Axys, Checkfree Security APL, DST GPS, DST InfoQuest, Eagle Investment Systems' STAR, FIN, FMC Pacer, Metavante, Princeton Financial Systems' PAM, Sungard Invest One, Sungard Addvantage, Thomson PORTIA</p> <p><u>Data Warehouse Interfaces</u> Eagle Investment Systems PACE</p> <p>Market Data: Bloomberg, Bridge Station, FT Interactive, Reuters, Thomson Global Topic</p> <p>Security Data Interfaces: Bloomberg® Data License, FT Interactive, SIAC</p> <p>Settlement System Interfaces: Charles River supplies standard file formats (flat files or XML) as well as a library of exports formats including ISO 15022 and these additional interfaces: FIX 4.2/4.4 allocations with TradeWeb, MarketAxess and equity brokers, Omgeo OASYS 4.0 for fixed income and equity, Omgeo CTM 1.3, ISITC 7775, ISO 15022, Fixed Income Clearing Corporation (MBS Electronic Pool Notification).</p> <p>Other: <u>Blotter-to-Blotter Software Integration</u> Color Book (Lava Trading), FutureTrade, ITG, RealTick, State Street, REDIPlus</p> <p><u>Equity ECNs and ATSS</u> ARCA, Bloomberg Tradebook, FutureTrade, ITG POSIT, Instinet, Lava Trading, Liquidnet and REDIPlus, NASDAQ</p> <p><u>Rules-based (Algorithmic) Trading Venues</u> JPMorgan (EES), Banc of America Securities (ETS), Credit Suisse (AES), Morgan Stanley (BXS)</p>	<p>Charles River IMS offers comprehensive support for all security types: equity, fixed income, money market, derivative, and currency based securities trading.</p> <ul style="list-style-type: none"> Designed for global 24/7 trading Supports all global security types, desk types, user profiles and workflows Comprehensive pre- and post-trade compliance capabilities FIX, electronic and advanced trading capabilities Flexible, open and scalable technology Message-based API for easy systems integration Extensive fixed income and multi-currency functionality Advanced cash management and forecasting User-configurable display, alerting and quick navigation FIX trading and settlement for equities, fixed income and foreign exchange Full support for mortgage trading and TBA processing Charles River also provides a Charles River supported and certified FIX network <p>Awards:</p> <ul style="list-style-type: none"> Best Buy-Side Order Management System, TradeTech 2007 Most Innovative Order Management Solution, Financial-I 2006 Best Portfolio Management System, Waters Reader Rankings 2006, 2005 Best Order Management System Waters Reader Rankings 2005, 2005 Top Compliance System, Global Investor 2005 Buy-Side Software Leader for 21st Century, Financial News 2006 Fintech Top 100, American Banker / Financial Insights 2006, 2005, 2004

Eze Castle Software
www.ezecastlesoftware.com

O V E R V I E W

BNY ConvergeX Group's Eze Castle® Software (Eze Castle) provides real-time, global multi-asset class investment technology to over 300 investment managers. Their technology incorporates a real-time open architecture to streamline the investment cycle for all asset classes – from idea generation through settlement.

The Eze Castle Product Suite includes:

- **Order Management System (OMS)** – a real-time, multi-asset class, multi-strategy OMS. Allows you to view tick-by-tick prices, volumes, bids, asks, and VWAP along side your trades. It offers real-time profit and loss monitoring by portfolio, security, strategy, sector, or industry.
- **Execution Management** – available in the OMS, the EMS functionality offers single-click execution in over 40 global markets and access to Level I and II market data, time & sales, DMA, TCA, market watch, and charts.
- **Portfolio Modeling** – a real-time, multi-asset class portfolio-modeling system used by the portfolio manager to perform “what if” analysis, rebalance and model portfolios, conduct strategy-based modeling, create orders, and monitor real-time trading activity.
- **Electronic Trading** – a FIX service that enables fast and secure electronic connectivity to over 350 sell-side destinations. It integrates the algorithmic strategies of 28 providers directly into the OMS.
- **Secure Data Transfers and Integration** – Eze Castle's secure data transfer service receives and transmits data with over 100 third parties including accounting systems, custodians, and prime brokers. An API provides real-time integration with non-Eze Castle products.
- **Real-time Compliance** – a real-time compliance provides investment managers and compliance officers with a corporate-wide solution to meet their pre-trade and post-trade compliance needs. It offers a real-time compliance blotter that tracks violations and approvals.
- **Mobile Connectivity** – a secure access portal that empowers investment professionals to perform important investment work from a handheld device or standard web browser.
- **Commission Management** – a fund expense and commission management system that provides tools for systematically planning, monitoring, and reporting on the brokerage allocation process, tracking soft dollar spending, and full reporting capabilities.

In 2006 Eze Castle merged with BNY Securities Group and is now a member company of BNY ConvergeX Group. With offices in Boston, New York, San Francisco, Stamford, and London, Eze Castle employs over 250 employees worldwide. Eze Castle has over 300 clients including asset managers, outsourced trading desks, and hedge funds, whose assets under management range from \$10 million to \$500 billion. Although Eze Castle is not specifically targeting the hedge fund community, it is used by over 225 hedge funds worldwide.

Eze Castle provides proactive client support for all of its products and services with over 85% of its employees devoted to the development, implementation, and support of software products. Each client is assigned a dedicated Eze Castle team of consultants located in their geographical location to manage their implementation and ongoing maintenance and support. Eze Castle consultants are on-site during all implementations to conduct workflow analysis, manage the implementation, and to train users.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Client leases the system.</p> <p>The Eze Castle product suite is available to clients on a subscription basis. Cost is based on the number of users and all support, maintenance, and training is included in the licensing fee.</p>	<p>Order Management:</p> <ul style="list-style-type: none"> Multi Asset Class Framework for security, trade, counterparty, and execution screens for each asset class List trading capabilities Automated allocation schemes for quick order entry, allocation, and execution Integration with market data and TCA vendors directly into blotter Multi-currency support for forward and spot hedging <p>Execution Management:</p> <ul style="list-style-type: none"> Single-click execution in over 40 global markets Embedded Level I and II, Time & Sales, Market Watch, and charts Embedded TCA <p>Electronic Trading:</p> <ul style="list-style-type: none"> Electronic trading connectivity to over 350 destinations Algorithmic strategies of over 28 brokers directly in the blotter Options trading framework FX trading framework Flexible technology to support multiple workflows for drop copies and staged orders <p>Modeling and Portfolio Management:</p> <ul style="list-style-type: none"> Multi-currency portfolio analytics and management Strategy-level allocation and portfolio modeling for up to 11 levels of strategies Support of multi-prime brokered portfolios and positions "What if" analytics Portfolio, strategy, sector, security, and asset class rebalancing <p>Compliance:</p> <ul style="list-style-type: none"> Monitor real-time pre-trade compliance checks and violations Flexible rule creation <p>Commission Management:</p> <ul style="list-style-type: none"> Create and manage budgets for directed brokerage relationships, third-party services, soft dollars, hard dollars, and proprietary research 	<p>Accounting/Portfolio Management Systems:</p> <p>Advent's Axys, Advent's Geneva, AIS, BISYS, BNY, CheckFree's Security APL, DPM, Eagle's PACE, EPAM, GIM2000, Hemisphere, High Port, Imagine, Integrated Business System's, VPM, ISITC 52x, MFACT, OMR, P2K, Penson, PKS, PMIS, QED, SEI, SS&C's Advisorware, SS&C's Fund Admin, SS&C's Hedgeware, SS&C's Total Return, Sungard's Invest One, Sungard's Shaw, Thomson Financial's Portia, Tradar, US Bank</p> <p>Prime Broker and Custodian:</p> <p>AIG, Bank of America, Barclay's, Bear Stearns, Cardinal, Chase, Citigroup, Citigroup (SSB), Commodities Corp, Credit Suisse, Custodial Trust Co. Deutsche Bank AG, DLJ, Fortis, Goldman Sachs, HSBC, IBT, Lehman Brothers, Mellon, Merrill Lynch, Morgan Stanley, Neuberger Berman, Northern Trust, Pershing, Royal Trust, Spear, Leeds & Kellogg (GSEC), State Street Bank, UBS</p> <p>Risk/Analytics and Others:</p> <p>Abel Noser (TCA), Communicator, EFA, ESP, Fact Set, Fidelity Capital Markets, FXAll, FXConnect, HFRA, ITG (TCA), Lyxor, OATS, Plexus, QSG, Wonda</p> <p>ECN, ATS, and DMA Platforms:</p> <p>ITG Channel, Instinet, ARCA, NASDAQ, Liquidnet, RealTick, BTrade, GTrade, Sonic, InstaQuote, FlexTrade, Watermark, FutureTrade, REDIPlus, Portal, Newport, Radical, Triton, Triact, Morgan Passport, Iceberg, Neovest, Patriot, Portware, Fidessa, Trading Screen, Trading Stream, Trading Technologies, Zeus, Fix-Trader, DTCC</p>	<p>In June of 2007 BNY ConvergeX Group's Eze Castle Software launched a single-system OMS that includes global EMS capabilities.</p> <p>Eze Castle's client service model is based on a regionalized team concept. Each client is assigned a team of consultants (Eze Castle's term for account manager/client service) who work directly with the client to manage implementations and upgrades, train, and provide ongoing phone and on-site support.</p> <ul style="list-style-type: none"> Centralized support for third-party integration and FIX connectivity Workflow analysis to incorporate technology to add efficiency to investment processes <p>In June of 2007 Eze Castle released version 5.3 SR5 of its product suite with the following enhancements:</p> <ul style="list-style-type: none"> Portfolio modeling for fixed income instruments FX Trading Framework, enabling buy-side traders to trade foreign exchange (FX) spots and forwards electronically with the sell-side directly from the Eze Castle OMS Integration with Markit RED

Fidessa LatentZero

www.latentzero.com

O V E R V I E W

Fidessa LatentZero is a global technology firm that specializes in developing complete front-office solutions for the buy-side community. Fidessa LatentZero's suite of front office products, known collectively as Capstone, is used by nine of the world's top 10 asset management organizations. More than 4,500 portfolio managers, traders and compliance officers worldwide rely on Capstone to manage assets in excess of \$10 trillion.

Capstone provides comprehensive functionality for equities, fixed income, listed and OTC derivatives, money markets, and FX and is comprised of the following functional components:

- Tesseract for portfolio analysis, modeling, "what if" scenarios and order generation
- Minerva OEMS (Order and Execution Management System) for order management, trading (EMS) and post trade processing
- Sentinel for pre and post trade investment compliance
- OTC Derivatives provides fully integrated pricing, trading and management of OTC credit, interest rate, inflation, equity and currency derivatives across all areas of the Capstone suite
- EMS adds full electronic trading capability, direct market access and transaction cost monitoring
- LatentZero Trading Network (LTN) is a fully managed, multi asset class trading network that connects users of Fidessa LatentZero's Minerva OEMS to trading counterparties. The network provides secure, robust, low latency connectivity to brokers, broker algorithms, ECNs, and ATs

Typical clients include institutional asset managers, fund managers and hedge funds that manage a diverse set of holdings including equities, fixed income and derivatives (OTC and exchange traded). Clients are located in North America and UK/Europe, and in the Far East.

- 20% of clients are small asset managers (<\$10 billion in assets, approximately)
- 25% of clients are mid-size asset manager (\$10-49.9 billion in assets, approximately)
- 55% of clients are large asset managers (>\$50 billion in assets, approximately)

Clients license from 10 users to over 500 and typically trade an average of 250,000 shares per day.

The Service Oriented, Event Driven technical architecture (SOA/EDA) that underpins Capstone works seamlessly with any front, middle or back-office technology. It provides a 24/7 high performance solution that is scalable and can be implemented globally from a single instance. Fidessa LatentZero supports the following hardware: IBM and compatible PCs, Intel-based PC Servers and Sun Servers. The MS SQL, Oracle databases are supported on the following platforms: Solaris, UNIX, Linux, Windows 2000, Windows XP.

Founded in 1999, Fidessa LatentZero is headquartered in both London and Boston and has offices in New York, Paris, Tokyo and Hong Kong and a presence in Singapore and South Africa. Fidessa LatentZero is a subsidiary of Fidessa. Fidessa employs over 1,000 employees globally with offices in New York, Boston, Toronto, London, Paris, Tokyo, and Hong Kong. Fidessa LatentZero employs 185 staff dedicated to development, support, and implementation the Fidessa LatentZero Capstone front office suite of tools.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Capstone has an annual license fee based upon many factors including number of users, locations, and modules licensed.</p> <p>10-user license ranges from \$140,000 to \$180,000 annually.</p> <p>20-user license ranges from \$190,000 to \$340,000 annually.</p> <p>40-user license ranges from \$280,000 to \$450,000 annually.</p> <p>Support and maintenance fees are included in the annual license.</p> <p>The LatentZero Trading Network (LTN) is priced separately as a monthly service fee for the FIX managed services.</p>	<p>Portfolio Management: Tesseract is a decision support tool for portfolio managers, covering equities, fixed income, derivatives, money markets and currency. It enables portfolio managers to easily manage investment models, analyze portfolios against models and benchmarks, perform "what if" scenarios, and generate orders to achieve investment objectives.</p> <p>Trading: Minerva can be configured and customized based on user's own data and workflow requirements.</p> <p>Minerva tracks commissions, directed brokerage relationships, step-outs and other trading restrictions.</p> <p>Compliance: Sentinel performs both pre- and post- trade compliance checks and warns PMs and traders of any order which would breach a mandate. Sentinel can track hard or soft mandates and allow for overrides if desired.</p> <p>Electronic Trading: Superior access to liquidity sources through algorithmic trading services and connections to multiple ECNs and execution venues using the FIX protocol. LatentZero is a broker neutral OEMS platform.</p>	<p>Capstone provides a robust and easy to use suite of adapters and APIs to facilitate integration with clients' systems. Fidessa Latent Zero's Systems Integration team assists clients in efforts to integrate with any network, data source or application.</p> <p>Market Data: Real time pricing and market data interfaces with Reuters, Bloomberg and Markit Partners.</p> <p>Other Systems: Instinet/Newport ITG Quantex/POSIT, Lava, Liquidnet, NYFIX, FXConnect, FXAll, Currenex, NYSE, ARCA, TradeXL (Morgan Stanley), WebEt (Goldman Sachs Futures), ExtraTrade (JP Morgan Futures), Omgeo's OASYS, CTM, Cameron Systems and others</p> <p>Comprehensive partnerships with leading brokerage firms' algorithmic trading platforms.</p>	<p>Fidessa LatentZero has extended the OMS to include execution management capability to become an integrated OMS/EMS system for the buy-side with electronic, broker neutral trading. Immediate access to all buy-side liquidity destinations including DMA and algos.</p> <p>Aggregated market liquidity views with the OMS blotter.</p> <p>Fidessa LatentZero also offers the LatentZero Trading Network (LTN). LTN is a fully managed trading network that connects clients to trading counterparties using the Fidessa Express network.</p> <p>Fidessa LatentZero offers a combination of technology, quality people and client partnerships. This combination allows Fidessa LatentZero to produce functionally rich products that run on a variety of platforms and meet the demanding needs of a diverse client set.</p> <p>Overall Strengths:</p> <ul style="list-style-type: none"> • Comprehensive multi-asset class support including complex OTC derivatives • Broker neutral embedded EMS • Superior architecture for scalability and global deployment

INDATA

www.indataweb.com

O V E R V I E W

Precision Trading, INDATA's trade order management system, links traders with portfolio managers, executing brokers, and back office staff in real-time, resulting in paperless and error-free trading.

INDATA is a provider of software solutions for buy-side firms including trade order management (OMS), portfolio accounting and front to back office. I.M.S. provides an organization with the ability to streamline its day-to-day operations by eliminating the inefficiencies produced by using multiple systems, thereby improving the effectiveness of portfolio management and trading while creating true enterprise integration and STP. I.M.S. consists of functional modules for portfolio management and reporting (IMS Back Office & Reports), trade order management (Precision Trading), performance measurement and attribution (APEX), integrated web-based CRM (InContact), and billing (IMS Billing). Modules can be combined to provide a total solution, or licensed separately to provide a "best-of breed" solution. Implementation of the system provides buy-side firms with operational efficiency and straight-through processing capabilities.

The range of assets under management is from \$400 million to over \$100 billion. The typical client is a buy-side asset management firm with a blend of institutional, taxable accounts, mutual funds, and hedge funds.

INDATA has a number of clients who use the system for the trading of international securities and also has clients that use the product exclusively for fixed income trading.

A typical implementation lasts 1-3 months from start to finish, including data conversion, installation, and training. Each client is assigned a dedicated account manager to oversee all aspects of product usage.

INDATA's flagship product suite, I.M.S. for Windows, utilizes an industry standard relational database platform (Microsoft SQL Server 2000) that results in a real-time, modular, and open architecture solution. Open/Relational database (Microsoft SQL Server 2005) client/server architecture runs on Windows XP/2003. Client PCs utilize Windows XP/2003. Browser based platform via InContact.net. SQL Server Microsoft Reporting Services allows browser-based delivery of information.

INDATA® has provided the investment community with timely and accurate transaction-based portfolio performance analysis products since inception in 1968.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Precision Trading is purchased.</p> <p>Licensing fee for the first year with a recurring fee for service and maintenance based on the number of users.</p> <p>Precision Trading pricing is generally competitive with other OMS vendors.</p>	<p>Portfolio Modeling, Compliance, Analytics: Full modeling (multi-level), “what if” analysis, tax lot trading utilities, comprehensive pre-trade compliance module; integration of analytical tools for attribution analysis, fundamental data, fixed income, etc.</p> <p>Electronic Trading:</p> <ul style="list-style-type: none"> • Links traders with portfolio managers, executing brokers, and back office in real-time, resulting in paperless and error-free trading • FIX compliance handles automated directed brokerage and step-out creation <p>Fixed Income: Handles all fixed income security types, specialized trading modules for mortgage/asset backed and cash management (i.e. commercial paper, money markets, etc.), interest rate swaps, credit default swaps</p>	<p>Portfolio Management: Single SQL database for users of IMS Back Office, INDATA’s multi-instrument, multi-currency portfolio management system. Other interfaces include Advent Axys, GIM 2000, Pacer, PORTIA, Security APL, and most other portfolio accounting systems.</p> <p>Market Data: Any vendor that supports DDE linkages (i.e. Thomson One, Reuters, etc.)</p> <p>Custodians: INDATA provides automated custodian interface tools. Omgeo interface (i.e. Oasys, TradeSuite); T+0 DTC Module</p> <p>Other: FIX compliant. Interfaces with analytical data providers including CMS BondEdge, StockVal, etc.</p>	<p>INDATA is a provider of enterprise software and ASP solutions for investment management firms.</p> <p>INDATA’s IMS product suite includes functionality for portfolio management and reporting, pre- and post-trade compliance, trader order management, performance measurement and attribution, integrated web-based CRM, and billing. Implementation of the system provides buy-side firms with operational efficiency and straight-through processing capabilities.</p> <p>Modules can be combined to provide a total solution, or licensed separately to provide a “best-of-breed” solution.</p>

LongView Trading

http://www.ldsam.com/longview_trading.html

O V E R V I E W

LongView Trading is Linedata Services' electronic, global, multi-asset class order management system developed to support the needs of portfolio managers, traders, compliance officers and operations personnel. The comprehensive, award-winning system provides portfolio modeling, electronic trading, pre-trade compliance and extensive access to liquidity. Through numerous partnerships and seamless integration, LongView offers customers access to the liquidity sources of their choice.

LongView Trading keeps its digital trading blotter in perfect synch with the blotters of EMSs integrated with the platform. This means LongView orders can reside on both the OMS and one or more EMSs at the same time, which allows traders to work trades in multiple locations simultaneously. LongView is implemented in ten of the top 25 global asset management firms, and more than 150 clients worldwide.

LongView Trading facilitates the creation of a true STP environment. The highly scalable architecture and robust personalization provide performance and simple configuration to users' existing workflows. The flexible nature of the system also offers customers the capability to customize the system for their specific STP strategy

Linedata Compliance is a global, enterprise-wide compliance monitoring and breach management solution that focuses on the complex business requirements and workflows of compliance officers, asset managers and fund administrators. The real-time system offers advanced pre- and post-trade compliance checking, comprehensive monitoring and flexible reporting capabilities across all markets, regulatory agencies, and asset types. Linedata Compliance also provides comprehensive monitoring of investment restrictions including client, firm, prospectus, and regulatory mandates.

Linedata Compliance offers speed, flexibility and scalability by using an N-tier, multi-threaded architecture. Linedata compliance is both a scalable, and an affordable solution for firms of all sizes. The system may be operated as a stand-alone compliance product or integrated with existing front and back office systems, is offered both as a hosted (ASP) and deployed solution.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Client has three options:</p> <ul style="list-style-type: none"> • License purchase • License lease • ASP license <p>Pricing for LongView Trading with pre-trade compliance only is based on the number of users on the system.</p> <p>Linedata Compliance, which includes post-trade compliance, is based on accounts or AUM.</p> <p>Maintenance costs are covered in the lease plan. Maintenance cost for the purchase plan is approximately 20% of the license.</p>	<p>Portfolio Modeling:</p> <ul style="list-style-type: none"> • Full multi-currency support • Predict impact on sector and portfolio-level analytics with “what if” scenarios • Rebalancing of accounts and account groups against pre-defined models <p>Compliance: Linedata Compliance offers speed, flexibility and scalability through its N-tier, multi-threaded architecture.</p> <p>Trading:</p> <ul style="list-style-type: none"> • Drag-and-drop orders to any FIX compliant broker, ECN, or ATS • Create and manage baskets, lists, and programs • Real-time IOIs fully integrated into the blotter 	<p>Portfolio Management: LongView Trading interfaces with over 20 different accounting systems and has interfaces to easily format files for any back-office system and/or real-time XML interfaces.</p> <p>Market Data: LongView Trading has the ability to interface via XML or local APIs with any pricing and market data vendors.</p> <p>Custodians: LongView Trading can pass a custom formatted file to custodians.</p> <p>Other: LongView Trading has standard interfaces to support products such as OASYS, CTM, OASYS Global, Plexus, algorithmic trading, direct market access, and transaction cost analysis.</p>	<p>LongView Trading has strong portfolio modeling capabilities and a strong international presence.</p> <p>LongView Trading can be provided as an ASP hosted solution.</p> <p>LongView Trading and Linedata Compliance have N-tier architecture in production, allowing for large-scale global implementations.</p> <p>Longview offers a single point of contact for electronic trading called LyNX, which provides full support from order generation through the FIX software, across any network providers in use, all the way to the sell-side's FIX engine.</p>

Macgregor XIP™

www.itg.com

O V E R V I E W

ITG's Macgregor XIP™ is a broker-neutral, global enterprise solution that combines portfolio management and trading applications with a fully integrated and supported financial services network. Designed to help asset management firms execute their investment decisions with increased speed, control, and efficiency, Macgregor XIP is customizable, extensible, and easily integrated with internal and external applications.

Key features:

- **Electronic Trading** – Macgregor XIP was designed for a dynamic and ever-evolving market environment with advanced electronic trading and algorithmic capabilities, functionality for single stocks and lists, numerous global connectivity options, and tools for easy summarization and allocation in an environment of increasingly smaller fills.
- **Portfolio Management** – Macgregor XIP offers a wealth of tools for conducting “what if” analysis, modeling and rebalancing, managing cash flows, conducting swaps and hedges, and optimizing portfolios for maximum performance.
- **Supports All Security Types** – Macgregor XIP supports multi-currency, multi-asset trading, including the ability to specify any underlying base currency at the system, account, or portfolio manager view levels. Includes specialized functionality for fixed income securities, wealth management, hedge funds, and other exacting investment strategies.
- **Conforms to Preferred Workflow** – Whether you need to conduct tax influenced management, manage a long-only portfolio, or diversify using numerous complex derivatives, Macgregor XIP offers the functionality and customization options to meet the most esoteric workflows.
- **Integrated Data and Applications** – Within one window frame you can serve up your choice of data and applications — for example, Microsoft Excel spreadsheets, web browser windows, and internal applications — all networked with existing Macgregor XIP data.
- **Extensible** – In addition to web services-based integration with proprietary and third-party systems, Macgregor XIP provides a software development kit that allows you to access the underlying business logic and truly tailor the application to your unique view of the world.

Additional OMS Modules (optional):

- Portfolio Compliance: ITG Compliance™ - daily compliance and real-time pre-trade compliance monitoring
- Connectivity: ITG NetSM - global, multi-asset financial communications
- Post-Trade Processing: ITG Trade Ops™ - automated post-trade matching, settlement, and confirmation service

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Client leases the license.</p> <p>Overall costs vary based on the number of licenses.</p> <p>Maintenance costs are included in the lease program.</p> <p>The FIX module is added to and included in the lease payment.</p>	<p>Portfolio Management:</p> <ul style="list-style-type: none"> • Customize portfolio holdings views in a spreadsheet-style grid featuring flexible aggregation/hierarchy/classification schemes and in-cell editing for easy order creation • Model and rebalance to target against indexes, statistical models, composites, and cash flows • Perform “what if” analysis with integrated real-time market data to determine the pre-trade impact of proposed orders <p>Compliance: ITG Compliance is available integrated or as a stand-alone system. With Macgregor XIP, ITG Compliance is integrated into the client’s workflow to assist in the notification of violations at any step in the order creation and trading process.</p> <p>ITG Compliance rules can be set-up or modified electronically using a natural language rule-building interface or can be imported.</p> <p>Trading:</p> <ul style="list-style-type: none"> • Locate liquidity quickly with global electronic connectivity to exchanges, ATSS, ECNs, numerous broker algorithms, and over 350 broker destinations through the ITG Net (formerly MFN) FIX network • Integrate easily with numerous third-party execution management systems (EMS) • Access numerous broker-sponsored algorithms as well as the POSIT crossing suite • Analyze execution costs and broker performance by integrating with ITG Logic and ITG TCA 	<p>Portfolio Management: Generic import and export facilities are provided to help integrate Macgregor XIP with each client’s portfolio accounting system(s), analytic system(s), and data warehouses. “Off-the-shelf” interfaces are available for popular accounting systems such as Advent Axys, Princeton, Portia, and others.</p> <p>Market Data: Macgregor XIP provides access to real-time market data via pricing feeds from Bloomberg and Reuters.</p> <p>Fixed Income: Macgregor XIP provides integration with both TradeWeb and MarketAxess fixed-income trading platforms.</p> <p>Other: ITG Trade Ops automates global post-trade securities matching and settlement communications through OMS integration and service bureau connectivity to the industry’s post-trade utilities and financial counterparties. ITG provides and manages all infrastructure for SWIFT, FIX, and Omgeo communications on an ASP basis. A web-based monitor provides you with transparency and control over the process.</p>	<p>Macgregor XIP supports all asset types including fixed income, equities and derivatives.</p> <p>The range of assets under management is from \$2 billion to over \$750 billion, with the typical client having greater than \$70 billion in assets under management.</p> <p>The typical client has more than 30 licensed OMS users and more than 40 FIX connections to their sell-side counterparts.</p> <p>ITG provides professional services to either build or assist in the building of custom interfaces. This service is provided on a time and materials basis.</p> <p>Macgregor XIP is fully integrated with ITG Net for electronic communication of FIX IOIs, orders, executions and post-trade allocations.</p> <p>The ITG Net service includes end-to-end support, testing and certification of all broker and ECN connections.</p> <p>The Macgregor XIP database server runs in the following configurations: Microsoft NT, Sun Solaris or HP/Unix running Sybase or Microsoft NT running MS-SQL Server. Workstations run in the following configurations: Microsoft NT.</p>

Sungard Asset Arena

www.sungard.com/assetarena

O V E R V I E W

SunGard's Asset Arena is a suite of front-to-back-office solutions that support the entire lifecycle of investment processes and operations. Serving asset managers and third-party administrators, Asset Arena offers components, which can be used alone or integrated, for trading, compliance, investment accounting, portfolio management and performance measurement and attribution.

Asset Arena components provide the following functionalities which can be implemented together or separately:

- **Asset Arena Portfolio Management** – Decision support for investment managers
- **Asset Arena Trading** – Global electronic trading and order management for asset managers
- **Asset Arena Compliance** – Pre-trade, post-trade, and end-of-day compliance for asset managers
- **Asset Arena Performance** – Performance measurement and attribution for asset managers
- **Asset Arena Investment Accounting** – Suite of service oriented architecture components that smartly support the whole investment process in asset management industry

Licensed by global institutional asset managers, Asset Arena helps to meet the needs of mutual funds, insurance portfolio, pension funds and hedge funds. Client assets range from \$10 billion to over \$300 billion. Asset Arena supports global organizations with multi-locations in the US, Europe, Asia, and South Africa.

Asset Arena supports multiple asset classes, multi-currency transactions, and multi-site, high-volume operations. It is designed to integrate with the external and internal systems needed throughout the trade life cycle: trading platforms, brokers, data-feed providers, back-office systems, custodians and more.

Asset Arena connects with other SunGard solutions and other best-of-breed applications to offer a front-to-back environment. The combination of Asset Arena front- and middle-office capabilities with Asset Arena Investment Accounting components now provides an end-to-end straight through processing solution for the global asset manager. Asset Arena can also connect to Adaptiv the SunGard integrated solution for cross asset trading, market and credit risk management.

Asset Arena supports client PCs running Windows XP or Windows 2000. The UNIX or Windows XP server runs on both Sybase and Oracle database software. Asset Arena modern Thinner Client multi-tier client/server architecture is fast, flexible, efficient and handles high volume in a very secure environment.

Asset Arena is marketed by SunGard Institutional Asset Management, a sector of SunGard Data Systems Inc. SunGard Asset Arena Trading employs over 150 professionals dedicated specifically to these components. SunGard's Professional Services team uses an approach called WISDOM to set up, deploy and support the solution in the client organizations. Their global support organization provides 24/7 client coverage. Asset Arena, with world headquarters in Boston, MA, is currently licensed at over 45 leading institutions in North America, Europe, Asia and South Africa.

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Asset Arena cost is based on multiple criteria and is always evaluated based on the specifics of a project. Criteria used in price determination is based on:</p> <ul style="list-style-type: none"> • Installed or serviced (ASP) implementation. • Purchase license or lease • Type of modules required (Trading, Compliance) • Number of locations • Number and type of users <p>Asset Arena provides a scaled pricing approach where clients can purchase a package of mixed modules as well as group of users (additional packages can be purchased as the business evolve).</p> <p>Annual maintenance is approximately 20% of the purchase price.</p>	<p>Portfolio Management:</p> <ul style="list-style-type: none"> • One central position keeping engine for all asset classes that tracks executed trades and pending orders, also provides a full audit trail • Helps to analyze and evaluate complex portfolios • Portfolio modeling and rebalancing capabilities: asset allocation, “what if” simulations • Large instruments coverage • Access to real-time market data <p>Compliance:</p> <ul style="list-style-type: none"> • Full pre- and post-trade compliance checks help firms comply with regulations and market practices • Extensive set of country rules packages provided • Rules Wizard to easily create and manage internal rules • Standard compliance PDF reporting <p>Trading:</p> <ul style="list-style-type: none"> • Provides order management, trading and market connectivity to achieve best execution • Access to all execution venues: ECNs (Electronic Communication Networks) via certified FIX connectivity • Direct market access to trading platforms • Highly customizable trading blotter • Fixed-income OTC blotter • Basket trading • Algorithmic trading • Post-execution services (CTM OMGEO) • Transaction cost analysis • Interactive real-time access to market data 	<p>Portfolio Management: Asset Arena integrates with many portfolio accounting systems using an open API. Partial list of existing systems includes: Asset Arena Investment Accounting, Portia</p> <p>Market Data: Asset Arena supports real-time connections to multiple data providers. Partial list of supported connections includes: Bloomberg, Reuters, Finalim, and FactSet.</p> <p>Custodians: Asset Arena’s open architecture allows for interfaces to be easily written to any external system. Asset Arena extracts the data from a central database and formats as required for the client interface.</p> <p>Other: FIX connection (for order routing, execution and allocation – all asset types)</p> <ul style="list-style-type: none"> • Omgeo OASYS • Omgeo Global OASYS • Omgeo CTM • SunGard Adaptiv 	<ul style="list-style-type: none"> • Has multi-currency capabilities and the ability to handle all asset classes • Asset Arena compliance and trading services can be implemented using web-services interface • Includes built-in pricing and valuation engine • Provides ad-hoc historical transactions, positions, prices, valuation and more • Powerful and flexible portfolio position engine • Extensive electronic connectivity • Partnership with TradingScreen (EMS) for sophisticated market connectivity and execution strategies. <p>The company continues to heavily invest in R&D, maintaining a leading position with its modern architecture and technology, adapting Asset Arena to the changes in both the financial and the technical worlds.</p>

Thomson TradeCentral

(www.thomson.com)

O V E R V I E W

TradeCentral is a seamlessly integrated order management system that provides end-to-end control over the entire trade cycle from pre-trade modeling through execution to allocation, compliance and settlement for the full range of global securities. It is ideally suited for managing multi-asset environments due to its robust functionality and seamless interoperability between TradeWeb and a range of other Thomson services, as well as other sources.

TradeCentral users typically have over \$1 billion in assets under management and trade the full range of asset types – domestic and international equities, domestic and international fixed-income, derivatives, futures, forwards FX and options. Clients include funds, banks, mutual funds, and retail advisors.

The Thomson Corporation is a leading global provider of integrated information-based solutions to business and professional customers and serves professionals in the fields of law, tax, accounting, financial services, scientific research and healthcare.

The Thomson Corporation is headquartered in Stamford, CT, holds offices in 37 different countries, employs over 32,000 individuals and generates over \$6 billion per year in revenues. The Thomson Financial segment employs 9,300 individuals and serves financial professionals, investment bankers, stockbrokers, portfolio managers, and corporate officers. Business brands include: Thomson ONE, Autex, TradeWeb, Datastream and Street Events.

The Corporation's common shares are listed on the New York and Toronto stock exchanges (NYSE: TOC; TSX: TOC).

COST	MODULES	THIRD PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Trade Central is offered as a deployed solution or the system can be hosted in an ASP environment. The deployed solution has two pricing options – purchase or lease.</p> <p>The purchase option has an annual maintenance fee, which entitles users to full access of upgrades and access to our support desk.</p> <p>Maintenance is included in the lease option pricing. Pricing is dependent on the number of named users on the system.</p> <p>The ASP solution has an annual license fee also dependent on the number of named users.</p> <p>Implementation and Professional Services are offered on a time and materials basis.</p> <p>The system is deployed internationally.</p>	<p>Portfolio Modeling:</p> <ul style="list-style-type: none"> • Full multi-currency support • Streamlined importing of security master and analytic data • Flexible security sector hierarchies • Management of multiple accounts with account grouping • Rebalancing of accounts and account groups against pre-defined models • “What if” analysis can be applied to single accounts or account groups • Portfolio, variance, and sector models can be used to rebalance accounts <p>Compliance:</p> <ul style="list-style-type: none"> • Advanced compliance checking capability is embedded in the product • Extensive rules library which includes rule sets defined by the major national regulatory agencies, as well as contractual limits and cross account exposure • Re-usable filters to provide a means of standardizing and simplifying complex rule setup • Rule sets offer a way to organize rules by source and apply them to portfolios or portfolio groups since rules can be parameterized and re-used in many contexts • Rule checking – both pre-trade orders and post-trade holdings are checked • Full audit trail of current and historical orders, rules, sets and breach resolution <p>Trading:</p> <ul style="list-style-type: none"> • Dynamic integrated real-time pricing and trade analytics • Basket, list, and program trading capabilities • Drag-and-drop orders to any FIX-compliant broker 	<p>TradeCentral has full integration with other Thomson Investment Management products. These include a comprehensive interface into TradeWeb for fixed-income execution and settlement, Oasis/Global Oasis for trade settlement, Thomson Order Routing (TOR) for FIX connectivity, Autex for IOIs, T1 for analytics, and PORTIA for accounting.</p> <p>Open database structure allows for straight-forward integration with any third-party system.</p> <p>ECN, ATS, and DMA Platforms: Algorithmic Trading – CSFB, Lehman, Bank of America, Deutsche Bank, Liquidnet, Instinet, Arca, Sonic, Lava, Flextrade, AMA (Algorithmic Market Access) from UNX, FXAll, FX Connect, Bear Stearns, Tradeweb, MarketAxess</p>	<p>There are over 30 people dedicated to the TradeCentral product. This infrastructure includes our support staff, system engineers, ASP management, sales and marketing, PSG and executive team.</p> <p>TradeCentral supports to following asset classes: Equities, fixed income, money markets, foreign exchange, funds, options, futures and swaps</p>



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