



ORDER MANAGEMENT SYSTEMS

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INTRODUCTION

Electronic trading volume has grown substantially over the past decade. The components of electronic trading, such as direct market access, algorithms, and a desire for paperless blotters, have spawned the growth of a range of trading solutions and new technology.

The use of trading technology can be traced back to the early 1990s, when the order management system (OMS) was introduced. Historically, order management systems 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 trades to several different accounts. The OMS was the answer to the error-prone, paper-intensive trading processes that were seemingly the norm for most firms. OMS technology has since evolved, making it much easier for firms to track compliance obligations, manage broker relationships, and keep the best interest of their investors at the forefront of their business operations.

As OMS products became more robust and task-oriented, the trading component began to suffer. The process-oriented OMS hindered the quest for reduced latency. Traditional market structures began to change via the proliferation of electronic connectivity networks (ECNs), direct market access (DMA), and the emergence of algorithms. To accommodate the new market structure and adapt to the low latency environment, the 2000s saw the debut of a new product called an execution management system (EMS), designed to complement the existing OMS products.

Over the past several years, these system providers have focused on evolving and enhancing functionality. The result has been an overlap and virtual blurring between the two products; the traditional OMS now carries functions of a basic EMS. And conversely, the capabilities of EMSs have begun to expand into what was traditionally the function of an OMS. Today's electronic trading systems now accommodate multiple asset classes, including equity, options, futures, and foreign exchange. Additionally, these systems are trending toward being multi-broker and increasing the availability of algorithms of multiple providers through a single platform. The following report provides information on the main components of these systems, the differences and similarities between them, trends in the industry, and other information to consider when purchasing these systems.

ORDER MANAGEMENT SYSTEMS (OMSs)

As previously noted, OMSs can be originally traced to the early 1990s. These systems were designed to connect the buy-side to their brokers electronically, while reducing errors and fostering a paperless trading environment. Early OMSs revolutionized the way the buy and sell-side conducted business. Today, OMSs are a much more robust, multifunctional product.

Order management systems are the central integration of front, middle, and back office functions. They range in functionality from pre-trade analysis to post-trade support.

The primary functions of an order management system include:

- Portfolio management, modeling, and construction
- Trade analysis
- Reporting
- Trade execution
- Trade management
- Trade allocation
- Compliance tracking
- FIX and custodial/accounting connectivity
- Risk management
- Clearing and commission management

Over the years, other functionality has been incorporated, such as direct access to algorithmic strategies and integration with execution management systems (EMSs). OMSs are generally thought of as the products that do the “heavy-lifting” functions, principally performing middle and back office functions.

COMPONENTS OF AN ORDER MANAGEMENT SYSTEM

Portfolio Management

Portfolio managers typically 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. Currently, many OMSs now offer real-time P/L monitoring as an added feature.

Compliance

The compliance module determines whether orders and trades meet compliance policies. Some additional benefits provided by a compliance module include post-execution monitoring, audit trails, and compliance administration. With constantly evolving 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. Trading modules have evolved to seamlessly integrate with EMSs and other trading systems.

FIX

The Financial Information eXchange (FIX) module provides for real-time trade and indication of interest communication between the trader, brokers, and execution venues. FIX is the industry standard protocol for the 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 either manually, or through some electronic means such as fax, e-mail, OASYS, FIX, etc.

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
- Includes the 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 are 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 Tradeweb, and Charles River.

EXECUTION MANAGEMENT SYSTEMS

With the blurring of functionality between OMSs and EMSs, we thought it would be helpful to provide some background information on EMSs. An execution management system (EMS) is a trading system, often delivered in an application service provider (ASP) model from a vendor's centralized database, which manages the execution of securities. EMSs were created to satisfy the need for low-latency trading, a function their more bulky OMS counterparts historically could not serve quite as well. Many factors have contributed to the creation and reliance on EMSs, including direct market access (DMA), electronic connectivity networks (ECNs), the proliferation of OMSs, and the popularity of algorithmic and smart order routing. The EMS can be broker-owned or provided by an independent software vendor. Typically comprised of four key components—a trading blotter, connectivity, multiple execution destinations, and real-time market data—an EMS offers the following basic functionality:

- Order staging and monitoring
- Single stock and list trading management
- Real-time market data
- Charting and trade analytics
- Real-time P/L
- Basic pre-trade and post-trade compliance

The EMS is a valuable tool for the buy-side trader who wants to take control of an order. EMSs are lightweight and far less demanding on computers than an OMS. Thus, they are easy to use, highly customizable, and quick to implement. If your desire is to trade complex strategies over multiple asset classes with several different brokers in markets all over the world, the EMS is a possible solution. They were built for speed and feature specialized technology needed to process the massive amounts of data generated by algorithms and today's fragmented marketplace.

ELECTRONIC TRADING TOOLS

Advances in technology have made trading more efficient than ever. As order management and execution management systems continue to enhance their functionality, additional trading tools have become available. For example, many systems continue to expand their access to various dark pools/crossing networks and a multitude of trading algorithms.

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 more than 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 dark pools have the ability to impact the natural price discovery process of traditional markets, they 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 percent of U.S. equity volume must provide open quotes to the broad market.

Algorithmic Trading

Algorithmic trading has gained popularity 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 driven 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.

Oftentimes, traders use their OMS to stage orders to an EMS where broker's algorithmic suites are integrated. It is also common for brokers to team with OMS vendors to integrate their algorithmic technology directly into the vendor's OMS front-end.

EMS OR OMS DECISION: WHICH SHOULD I USE?

EMSs are generally thought of as products catering to those who trade frequently, where speed is a concern. OMSs, on the other hand, tend to be common for firms more interested in middle- and back-office functionality. Although an OMS offers trading capability, it's frequently not the best fit for active trading where speed is imperative. If your firm requires significant automation in trading and an ability to customize the trading

process, such as with advanced algorithms, an EMS might be a suitable fit. However, if major requirements include workflow management between the portfolio manager and trader, extensive compliance needs such as pre-trade compliance reviews, and accounting functionality, an OMS is typically the more ideal tool.

Deciding whether to use an EMS or an OMS is a complex process. Each firm may have different needs that warrant one product over the other. Many buy-side firms operate with an EMS (or multiple EMSs) only, while others succeed with solely an OMS. Additionally, some find that the complex nature of their workflow requires an EMS and an OMS operating independently of one another or integrated via a FIX connection. The reality is that nuances and the culture within each firm will drive its trading software deployment decisions. For guidance in selecting the right product for your needs and to compare the two, refer to the table below.

	OMS	EMS
Characteristics	“Sticky,” robust, multi-functional. Heavily integrated with overall company workflow. Usually have multiple users (compliance officials, portfolio managers, traders, etc.).	Lightweight, thin client application, not resource-taxing. Typically easy to learn, install, and implement.
Primary Functions	Compliance, portfolio modeling, settlement, commission management, risk management, allocations	Order staging, order entry, real-time market data, charting, DMA, algorithms, advanced trading tools
Typically used by	Long only, less frequent traders. Portfolio managers, analysts, and compliance officials	Hedge funds, higher frequency traders using arbitrage strategies and customized algorithms
Fees commonly incurred by	Buy-side firm using the product	Sell-side brokers receiving the order flow

INDUSTRY TRENDS

OEMS

Currently, one of the biggest trends is the concept of a globally integrated OMS and EMS, the order execution management system (OEMS). In an effort to gain market share and edge out competition, many OMS and EMS vendors have teamed up to provide the all-in-one solution to meet the buy-side’s trading demands. It is no secret that buy-side traders often utilize several different EMSs, and it is not uncommon for them to have five or more different systems running simultaneously. The OEMS could simplify workflows and potentially eliminate the need to have numerous EMSs that do not communicate with one another.

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.

The creation of an OEMS, however, is not an easy task. OMSs and EMSs have totally different architectural builds. A true soup-to-nuts OEMS would have the ability to trade all asset classes, in every liquidity venue, in all geographies, at very quick speeds. This system would eliminate the (although electronic) still very manual

process of canceling and re-routing trades among numerous different systems. Although this solution may still be a bit of a stretch, many technology firms are working to constantly enhance their technology with the ultimate goal of creating a fully functioning OEMS. But many critics believe that a one-system approach of combining the two products will detract from each of their respective competencies. Skeptics think it's impossible to offer the comprehensive functionality of an OMS with the nimble, speed-focused capability of an EMS.

Updating Technology

A number of OMS providers have recently upgraded their technology or completely rewritten their system architecture. Since many of the OMSs were developed years ago, it was time to update the legacy infrastructure to make the platforms more flexible. This has resulted in a truly customizable product that can accommodate the disparate needs and workflow demands of the end users. The result is an "off the shelf" product with a high level of user-defined customization.

Real-time Market Data

Many OMSs are beginning to incorporate real-time market data to enhance the basic functionality such as trading, compliance, and portfolio P/L calculations. In addition to using historical data within the built-in database, real-time data feeds are expanding the appeal of OMSs.

Options Capabilities

The industry has seen a discernable shift toward the accommodation of multi-asset class trading. Specifically, the options market has experienced immense growth among the buy-side community. OMS providers have responded to the growth by broadening the scope of how their product handles options trading. Many of them now provide built-in options tables, multi-leg trading capabilities, and 'what if' scenarios for an options exercise and assignment.

Regulatory Compliance Functionality

Although compliance has been a component of OMSs since their advent, recent market conditions and more stringent industry regulation has prompted many providers to increase their capabilities. Technological investment to accommodate compliance and regulatory adherence for buy-side companies is no longer a question of "Should we invest?" Today, investing in technology is a requirement to meet client demands and increasing industry regulation. OMS providers are making pronounced efforts to enhance the functions of their products in the areas of pre- and post-trade compliance. Many OMSs will continue their developments to handle the most complex rules that govern many asset classes and the reporting requirements that go along with trading these assets.

CONSIDERATIONS WHEN IMPLEMENTING AN ELECTRONIC TRADING SYSTEM

Purchasing a new system, or replacing an existing one, is a time-consuming effort that requires the involvement of numerous people and departments. Implementation times can vary depending on which modules and functionality best suit the firm's needs. Therefore, it is important to consider several different factors when beginning the search for an electronic trading system. Due to the high level of integration and diverse capabilities, the quest for an OMS is typically more involved. However, the following considerations can help your firm make the right decision when determining which electronic trading system—an OMS, an EMS, or both—is best for your firm.

Product Price

Order management systems are either purchased or leased. Some vendors offer only one option while other vendors offer both. Purchasing a system usually entails a higher initial outlay of costs with monthly maintenance fees costing 20 to 25 percent of the system price. Leased systems come with a lower initial cost

but incur higher monthly premiums. Installation and integration costs are not usually included in the price of the system; be sure to inquire about these costs.

On the other hand, a buy-side firm can typically get an EMS on their desktop at no charge to them, as the brokers receiving the trade flow pay for the fees. Keep in mind that when a broker has agreed to absorb the fees, a certain amount of trading commission may be expected.

Implementation Process

Implementation of an OMS often takes three to six 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. In contrast, EMSs can typically be implemented quickly as they are usually delivered via the Internet.

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. When implementing either an EMS or an OMS, be sure to ask client references about the level of support they received 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, 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 measure 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 these 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 OEMS may be on the horizon. At the very least expect a continued crossover in the functionalities of the two systems. In addition, you may see continued mergers and acquisitions between brokers and technology system providers in an effort to develop seamless integration between systems.

While the task of implementing or replacing any technology system may seem daunting, CAPIS's electronic trading department is available to assist in your efforts. For more information on order management systems, execution management systems, or general electronic trading inquiries, please contact Doug McPhail at 214-978-4771.

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 more than 875 firms and has a presence in 60 countries throughout North America, Europe, Africa, and the Middle and 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 875 firms.

Advent Software employs more than 1,000 individuals in offices in San Francisco, New York, Boston, and 10 European cities.

Advent has over 200 professionals on its professional services team who are dedicated to implementing clients and supporting larger clients for all Advent product offerings. Advent is the only SCP Certified Support Organization in the financial software industry. Since 2005, they have consistently achieved the prestigious Support Center Practices (SCP) certification. The SCP program quantifies the effectiveness of their support based on a stringent set of performance standards that represent best practices in the industry.

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 \$135,000 to \$220,000.</p> <p>A 40-user license ranges from \$260,000 to \$405,000.</p> <p>Maintenance currently runs between 15 to 20 percent of the current software price.</p> <p>The FIX module currently runs from \$9,000 for an open FIX license to any network. Advent has a preferred relationship with Sungard Transaction Network (STN) where some costs of licensing are subsidized.</p> <p>Annual term licenses are 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"> • Advent Rules Manager released in 2007 is targeted for more complex compliance requirements for institutional asset managers. Product is fully integrated with Moxy. • Native Moxy compliance rules include the following examples: <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 inbound and outbound tags using FIX mapping, mapped values, or derived values • Two-way FIX messaging as well as one-way or unsolicited trade requests (UTRs) • Currently supports FIX 4.0 and 4.2 	<p>Portfolio Management:</p> <p>Clients most often use one of Advent’s portfolio accounting systems, Advent Portfolio Exchange (APX), Axys, or Geneva. Advent has the ability to integrate to any third party portfolio accounting products via customization during implementation.</p> <p>Market Data:</p> <p>Advent offers supported real-time pricing through an interface to FT Interactive Data’s ESignal product 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:</p> <p>Advent has current links with over 450 custodians. See www.advent.com for a complete list.</p>	<p>Moxy has an installed customer base of over 875 firms.</p> <p>Advent is the Only SCP Certified Support Organization in the financial software industry. Advent has achieved the prestigious Support Center Practices (SCP) certification consistently since 2005. The SCP program quantifies the effectiveness of their support based on a stringent set of performance standards that represent best practices in the industry.</p>

Antares
www.ssctech.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 starts at \$100 million for some of the smaller hedge funds, and extends 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 and 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 multinational, multi-industry support capabilities.*

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

Technology/Software Partners - *Companies with technology and software that complement 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.

COSTS	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 to \$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 multicurrency 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, and Baseline.</p> <p>Custodian/Prime Broker: Antares currently has custom interfaces with Goldman Sachs and Morgan Stanley. A widely adaptable generic interface 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 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 AIM (Alternative Investment Order Management System)

www.bloomberg.com

O V E R V I E W

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

Bloomberg AIM offers order and execution management, portfolio analysis, risk, compliance, and STP. AIM links these components together in a seamless workflow that is tightly integrated into the packaged Bloomberg terminal. The combined solution is fully hosted.

Currently, AIM is employed at over 500 buy-side firms globally. The range of assets under management is from \$20 million to \$500 billion, with the typical AIM client having between \$5 and \$50 billion in assets under management.

Bloomberg AIM customers have their own secure encrypted database housing account and position data. The databases are built and maintained by Bloomberg. The Bloomberg AIM 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 via TCP/IP and FTP.

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

Bloomberg L.P., founded in 1981, provides news, pricing, and analytics via the Bloomberg Professional Service to more than 300,000 dedicated desktop terminals globally. Bloomberg AIM 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 more than 10,000 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>AIM pricing structure revolves around using the Bloomberg Professional Service as the central application for straight-through processing.</p> <p>For U.S. clients, AIM 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 AIM 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 AIM data feeds into back-office systems and other downstream applications. AIM also has direct links with custodians and prime brokers.</p> <p>Bloomberg AIM 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 online reporting and scenario analysis (Crystal Report viewer included) <p>Compliance: AIM 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 Buyside 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 its 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 AIM. Industry standard attribution models are used to evaluate fund performance and 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 to \$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 4.4 compliant counterparty.</p>	<p>Portfolio Management: <u>Charles River Manager</u></p> <ul style="list-style-type: none"> Advanced multicurrency 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> 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 multicurrency 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

Eze Castle Software
www.ezecastlesoftware.com

O V E R V I E W

Eze Castle® Software, a member of BNY ConvergeX Group, provides global investment technology solutions for streamlining the investment process. The company's core offering, the Eze OMS™, leverages a real-time open architecture to streamline the investment cycle for all asset classes, from idea generation through settlement. The Eze OMS provides functionality to support portfolio management, compliance, trading, and operations in a single platform. It supports intuitive trading workflows specific to the asset class. Today more than 380 buy-side firms use the Eze OMS to manage their investment processes.

The Eze OMS is comprised of four seamlessly integrated modules:

- **Eze Portfolio Management**

The Eze OMS's real-time, multi-asset class portfolio-modeling system allows portfolio managers to perform "what if" analysis, rebalance and model portfolios, conduct strategy-based modeling, create orders, and view and analyze real-time event-driven analytics including P&L and exposure by portfolio, security, strategy, sector, or industry.

- **Eze Compliance**

The Eze OMS's real-time, multicurrency, multi-asset class compliance functionality provides investment managers and compliance officers with a corporate-wide solution to meet their pre-trade and post-trade compliance needs. Eze Compliance allows you to track and monitor your trading compliance using real-time pricing and holdings and provides a compliance blotter that tracks violations and approvals. Includes a library of hundreds of industry-standard rules, single-screen rule and alert manager, and integration with Microsoft Outlook.

- **Eze Trading**

The Eze OMS provides a real-time, multi-asset class, multi-strategy OMS with embedded EMS and intuitive, asset-class specific workflows. Eze Trading allows you to view tick-by-tick prices, volumes, bids, asks, and VWAP alongside your trades, and execute orders using single-click DMA to over 40 global markets or via FIX to more than 400 sell-side destinations including 370 algorithmic strategies from more than 36 brokers. The Eze OMS offers access to Level I and II market data, time and sales, DMA, TCA, market watch, and charting as well as natural liquidity through ConvergeX Cross.

- **Eze Operations**

Eze Operations includes a secure third-party interface service, Eze Interface, for seamlessly interfacing with over 150 third parties including accounting systems, risk systems, custodians, and prime brokers. Includes encrypted transmission of transaction data, centralized data process for a streamlined workflow, and dedicated support team for developing, testing, implementing, and monitoring interfaces. Features real-time two-way interface with third-party systems. Eze Operations also offers a fund expense and commission management tool that helps you systematically plan, monitor, and report on the brokerage allocation process, track soft dollar spending, and run comprehensive budget reports.

Eze Castle Software is a wholly-owned subsidiary of BNY ConvergeX Group. Eze Castle employs more than 350 people worldwide, with offices in Boston, New York, San Francisco, Stamford, London, and Hong Kong. More than 380 clients, including asset managers, outsourced trading desks, and hedge funds, whose assets under management range from \$10 million to \$500 billion, use the Eze OMS to manage their investment process. Although Eze Castle does not specifically target the hedge fund community, it is used by more than 260 hedge funds worldwide.

Eze Castle provides proactive client support for all of its products and services with over 85 percent 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 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>Eze Portfolio Management Modeling & Rebalancing</p> <ul style="list-style-type: none"> Flexible, multicurrency portfolio and security modeling “What-if” benchmark analysis Highly efficient rebalancing by portfolio, strategy, sector, security, and asset class Tax-lot analysis and management <p>Real-time Analytics</p> <ul style="list-style-type: none"> Real-time, event-driven P&L and exposure P&L and exposure attribution by security, portfolio, group, asset class, country, sector/industry, and strategy Intraday P&L or total P&L for the lifetime of the position <p>Compliance:</p> <ul style="list-style-type: none"> Multicurrency, multi-instrument pre- and post-trade compliance using real-time prices and holdings Real-time alerts Library of hundreds of industry-standard rules and rule templates and easy-to-use rule builder <p>Trading</p> <p>Order Management:</p> <ul style="list-style-type: none"> Automated allocation schemes for quick order entry, allocation, and execution Integration with market data and TCA vendors directly into blotter <p>Execution Management:</p> <ul style="list-style-type: none"> Single-click execution in over 40 global markets Embedded Level I and II, Time and Sales, Market Watch, and charts Embedded TCA <p>Electronic Trading:</p> <ul style="list-style-type: none"> Electronic trading connectivity to over 400 destinations 370+ algorithmic strategies of 36+ brokers directly in the blotter Options trading framework <p>Operations</p> <p>Third-party Interfaces</p> <ul style="list-style-type: none"> 150+ established interfaces. <p>Reporting and record keeping</p> <ul style="list-style-type: none"> Complete audit trail Flexible and comprehensive reports Historical views for any day, month, or year 	<p>Accounting/Portfolio Management Systems:</p> <p>Advent Axys, Advent APX, Advent's Geneva, AIS, BNYM – AIS, Beauchamp, CheckFree APL, DPM, Eagle, Electra , EPAM Princeton , FIN, IFA, Linedata MFACT, P2K, PMIS, SEI, SS&C Total Return, SS&C AdvisorWare, SS&C, Hedgeware, SS&C Pacer, Simcorp, Sungard Invest One, Sungard Shaw, Sungard VPM, Thomson Financial Portia, Tradar, US Bank</p> <p>Prime Broker and Custodian:</p> <p>Bank of America, Bank of Ireland, Barclays, Baypoint PB, Citibank, Commodities Corp, Credit Suisse, Deutsche Bank , FCM, Fidelity Prime Broker Services, Goldman Sachs, GSEC, HFR, HSBC-PB, ISITC, Jeffries, JPM Chase, Lehman Brothers , Merrill Lynch, Morgan Stanley, Natexis Bleichroder, Northern Trust, Penson, Pershing , PFPC-PB, Royal Trust, State Street, UBS</p> <p>Administrators</p> <p>Bank of New York Mellon, BISYS, Caledonian, CITCO, Citibank Admin, Columbus Avenue, Conifer, CTC, Deutsche Bank PWM, DLJ, Fortis, Globe Ops, Goldman Sachs, Hedgeworks, HFR, HSBC, IFS, JD Clark, Kaufman Rossin , Meridian, Millennium, Ophedge, PFPC Security Benefits, Spectrum, SS&C Fund Admin, SS&C Fund Camra</p> <p>Risk/Analytics and Others:</p> <p>Abel Noser, ALPS, BISYS, BNY Jaywalk, BPAS, Carlin Securities, Code Red, Cogency Software, Cuttone & Company, Delta Hedge, Eze TCA, FactSet, FINCAD, Fulcrum, FXAll, PMAS, FXConnect, Imagine Software, ITG, Lasers, Lyxor, Markit, OATS, QED, QSG, Risk Metrics, Sierra Hedge, SunGard Front Arena, Tamale, Wonda</p> <p>Settlement</p> <p>Omgeo Automatch, Omgeo CTM, Omgeo OASYS, Omgeo OASYS Global, Markit NEWCO</p>	<p>Eze Castle has spent much of 2008 continuing the migration to a service-oriented, event-driven architecture leveraging .NET technology.</p> <p>In May of 2008, Eze Castle launched its Asia Pacific client service and sales office based in Hong Kong.</p> <p>In June of 2007 Eze Castle launched a single-system OMS that includes global EMS capabilities with single-click access to over 40 global markets, embedded Level I and II, Time and Sales, Market Watch, and charts.</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. Eze support also includes workflow analysis to incorporate technology to add efficiency to investment processes and centralized support for third-party integration and FIX connectivity.</p>

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 is known collectively as Capstone. More than 8,000 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 comprises 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, 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
- A stand-alone, hosted Workstation EMS can be deployed. This is delivered as a broker-neutral ASP solution; it provides market data, connectivity, and trading for global equities and listed derivatives, and can receive orders from and send executions to any third-party OMS via FIX

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 the U.K./Europe, and in the Far East, with one in South Africa.

- 20 percent of clients are small asset managers (<\$10 billion in assets, approximately)
- 25 percent of clients are mid-size asset managers (\$10-49.9 billion in assets, approximately)
- 55 percent 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 and Oracle databases are supported on the following platforms: Solaris, UNIX, Linux, Windows 2000, and Windows XP.

Founded in January 1999, Fidessa LatentZero was acquired by the Fidessa group in April 2007. The Fidessa group is headquartered in London and has offices in Boston, New York, Tokyo, Hong Kong, Paris, Toronto, and San Francisco. Fidessa Group was founded in 1981, has revenues of around \$350 million, employs over 1,200 people and has been fully listed (LSE:FDSA) since 1997. Fidessa LatentZero employs 190 staff dedicated to the development, support, and implementation of 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 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 that 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. Fidessa 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. 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 • Intuitive user interface/ look and feel, highly customizable trade-screens, and richness of functionality make it adaptable to any asset class, investment style, and workflow.

INDATA

www.indataweb.com

O V E R V I E W

Precision Trading, INDATA's broker and network-neutral OMS, links traders with portfolio managers, executing brokers, compliance, and back-office staff in real-time, resulting in error-free trading. Precision Trading is part of the IMS Suite of products and is available as an in-house or ASP solution with full technology outsourcing.

INDATA® is a leading industry provider of software solutions for buy-side firms including trade order management (OMS), compliance, portfolio accounting, and front-to-back office. The company's IMS (Investment Management System) product suite provides an integrated platform based on the latest database technology (Microsoft® SQL Server™) that consists of functional modules for portfolio modeling, pre- and post-trade compliance, trade order management, portfolio accounting and reporting, performance measurement and attribution, composite maintenance, billing, and web-enabled CRM. 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, mutual fund, and hedge fund accounts.

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

A typical implementation lasts one to three 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® was founded in 1968.

COST	MODULES	THIRD-PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Precision Trading has a licensing fee for the first year with a recurring fee for service and maintenance based on the number of concurrent users and modules used.</p> <p>Precision Trading pricing is competitive with other OMS vendors.</p> <p>All version upgrades are included in the client agreement with no additional costs.</p> <p>In addition, INDATA allows OMS clients to outsource their system administration.</p>	<p>Portfolio Modeling, Compliance and Analytics:</p> <ul style="list-style-type: none"> • Robust portfolio modeling and rebalancing, comprehensive “what-if” analysis across asset classes • Multi-security swapping features along with condition “if/then” order generation • Multicurrency, multi-asset including extensive tools for short strategies and 130/30 fund management • Tax-lot tracking tools for tax-efficient portfolio management and trading strategies • Efficient family and group trading capabilities • Fully integrated analytics including risk, attribution, fundamental data, etc. <p>Real-Time Pre- and Post-Trade Compliance:</p> <ul style="list-style-type: none"> • Real-time pre- and post-trade compliance monitoring including regulatory compliance (i.e., Investment Company Act of 1940) • Easy to use Compliance Wizard for rule setup and maintenance • “What if” scenario for compliance rules and real-time checks • Easy rule customization <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 error-free trading • Real-time blotter analytics with complete integration of live pricing and analytical data from 3rd party providers and other EMS functionality including effective program and list trading tools • Extensive connectivity with established algorithmic trading providers and dark pools • Integration with third-party Transaction Cost Analysis (TCA) providers <p>Fixed Income/Derivatives:</p> <p>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:</p> <p>Single SQL database for users of IMS Back Office, INDATA’s multi-instrument, multicurrency portfolio management system. Other interfaces include Advent Axys, Advent APX, GIM 2000, Pacer, PORTIA, CheckFree Security APL, FIN, All SunGard (PORT, Portfolio One, etc.) all trust accounting systems from SunGard (AddVantage, Charlotte, etc), SEI, InfoVisa and most other portfolio accounting systems</p> <p>Market Data:</p> <p>Any vendor that supports File, DDE or FTP linkages (i.e. Telemet, Thomson One/Reuters, etc.), Bloomberg Data License interface, FT Interactive Data, CMS BondEdge, StockVal, FactSet, Baseline, Vestek, etc.</p> <p>Trade Settlement:</p> <p>INDATA provides automated custodian interface tools. Omgeo interface (i.e. Oasys, TradeSuite); T+0 DTC Module; Omgeo CTM, Brown Brothers Infomediary</p> <p>ECNs, ATSS, Broker Front-ends:</p> <p>ITG, Instinet, Lava, ARCA, REDIPlus, Liquidnet, ITG Channel, etc.</p> <p>Algorithmic Trading:</p> <p>Most established brokers; dominant platforms include Credit Suisse AES and ITG.</p> <p>FIX Networks/Other:</p> <p>State Street Global Link, NYFIX, TradeWeb, SunGard, TNS. In addition to FIX, full support of XML-based interfaces</p>	<p>Precision Trading is a broker-neutral OMS with a network-neutral solution.</p> <p>In addition, INDATA provides additional modules as part of the IMS suite of products including:</p> <ul style="list-style-type: none"> • Optional multi-asset, multicurrency portfolio accounting module with integrated custodial reconciliation tool and billing system • GIPS-compliant performance measurement, including daily performance measurement and attribution against major benchmarks with complete client reporting module • Web-based front-office tool for holistic client view that integrates OMS, portfolio management, performance, and attribution alongside full client relationship management (CRM) functionality <p>INDATA offers Precision Trading on both a hosted/ASP environment as well as an in-house solution. INDATA’s ASP product is mature and has been selected by leading global asset management organizations.</p>

LongView Trading

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 that has been 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 sync 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 10 of the top 25 global asset management firms and with 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, as well as 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, multithreaded architecture and is both a scalable and 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, and is offered as both 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 percent of the license.</p>	<p>Portfolio Modeling:</p> <ul style="list-style-type: none"> • Full multicurrency support • “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, multithreaded architecture. The module is available as an integrated pre-trade function or as a stand-alone compliance engine.</p> <p>Trading:</p> <ul style="list-style-type: none"> • LongView Live – An integrated trading solution that combines market data, advanced trading tools, and commission management. • Fixed income – Offers full straight through processing with all major electronic fixed income trading venues. • Drag-and-drop orders to any FIX-compliant broker, ECN, or ATS • Create and manage baskets, lists, and programs <p>Real-time IOIs fully integrated into the blotter</p>	<p>Portfolio Management: LongView Trading interfaces with more than 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, 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. Thirty percent of their clients employ the hosted model.</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>

O V E R V I E W

ITG Triton X™ is a global software solution for integrated portfolio management, compliance, and trading designed to maximize user functionality, agility, and speed while providing superior enterprise processing and controls. Delivered on a next-generation technology platform, ITG Triton X combines award-winning EMS functionality with comprehensive OMS capabilities. The system is customizable, extensible, and easily integrated with other applications. For a complete investment management solution, optional integrated tools are available for pre-trade analytics, global FIX routing, post-trade measurement, and post-trade processing.

Key features include:

- **Electronic Trading** – Combines the safety and control of the OMS with the speed, ease-of-use, and agility of the EMS. It supports a dynamic and ever-evolving market environment with award-winning 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** – Includes 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.
- **Compliance** – Conducts real-time compliance monitoring, pre-trade testing, and post-trade reporting when integrated with ITG Compliance™ to ensure portfolios adhere to global investment guidelines, regulations, and firm policies. ITG Compliance speeds research and resolution whenever potential compliance exceptions are detected.
- **Broad Security Coverage** – Supports multicurrency, 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.
- **Customized Workflow** – Offers the functionality and customization options to meet the most esoteric workflows whether you need to conduct tax-influenced management, manage a long-only portfolio, or diversify using numerous complex derivatives.
- **Integrated Data and Applications** – Integrates easily with multiple applications and makes all ITG Triton X data available within the external application. For example, a standard Excel integration allows for real-time updates. Built-in APIs allow selections in the core application to be signaled to client extensions or web-based applications.
- **Extensible** – Extensible using .NET plug-ins and extensions, ITG Triton X can be customized easily to accommodate a firm’s trading, portfolio management, compliance, and operational preferences. In addition to web services-based integration with proprietary and third-party systems, ITG Triton X provides both a front-end and back-end API that allows access to the underlying business logic and the ability to truly tailor the application.

COST	MODULES	THIRD-PARTY INTERFACES	OTHER NOTES OF INTEREST
<p>Client licenses the application.</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 (optional) is integrated into the client’s workflow to assist in the notification of exceptions at any step in the order creation and trading process. ITG Compliance is available integrated or as a stand-alone system.</p> <p>The ITG Compliance rule builder easily supports regulations and rules commonly found in IMAs. ITG maintains common regulatory rule sets for the U.S., Canada, and Europe.</p> <p>Trading: Locate liquidity quickly with global electronic connectivity to exchanges, ATSS, ECNs, numerous broker algorithms, and optional access to over 400 broker destinations through the ITG NetSM (formerly MFN) FIX network</p> <p>Extensive, award-winning Execution Management System (EMS) capabilities</p> <p>Access to numerous broker-sponsored algorithms as well as the POSIT[®] crossing suite</p> <p>Analyze execution costs and broker performance through integrated ITG Logic[®] and ITG TCA[™] (optional)</p>	<p>Portfolio Management: Generic import and export facilities are provided to help integrate ITG Triton X 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: ITG Triton X provides access to real-time market data via pricing feeds from Bloomberg and Reuters.</p> <p>Fixed Income: ITG Triton X provides integration with both TradeWeb and MarketAxess fixed-income trading platforms.</p> <p>Other: Optional ITG Trade Ops integration automates global post-trade securities matching and settlement notification through service bureau connectivity to the industry’s post-trade utilities and financial counterparties. ITG Trade Ops[™] 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>ITG Triton X 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 users and more than 40 FIX connections to sell-side counterparties.</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>ITG Triton X is fully integrated with ITG Net for electronic communication of FIX IOIs, orders, executions, and post-trade allocations. It includes end-to-end support, testing, and certification of all broker and ECN connections.</p> <p>The ITG Triton X database server runs in the following configurations: Microsoft Windows Server, Sun Solaris or HP/Unix running Sybase or Microsoft Windows Server running SQL Server. Workstations run in the following configuration: Microsoft XP.</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 life cycle of investment processes and operations. Serving asset managers and third-party administrators, Asset Arena offers components that 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 supports the whole investment process

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

Asset Arena supports multiple-asset classes, multicurrency 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 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's 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 division 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 more than 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 are based on the following:</p> <ul style="list-style-type: none"> • Hosted or 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 evolves).</p> <p>Annual maintenance is approximately 20 percent 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: Electronic Communication Networks (ECNs) 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 for 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 multicurrency 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 invest heavily in R&D, maintaining a leading position with its modern architecture and technology and adapting Asset Arena to the changes in both the financial and technical worlds.</p>



Technology makes it work. **People make it happen.**

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