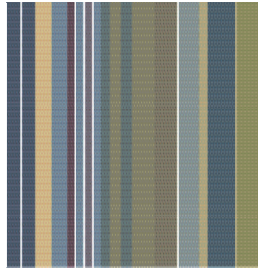




SUNGARD VPM



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The Next Generation of Hedge Fund Technology

by Peter Neems, vp solutions management, SunGard VPM

The Next Generation of Hedge Fund Technology

“Technology vendors serving hedge funds must develop the next generation of investment accounting systems – a generation which serves a heightened sense of operational efficiency and risk management, speedier information flow, open architecture and highly scalable technology that helps meet today’s demand for transparent ad-hoc reporting required by regulators and investors alike.”

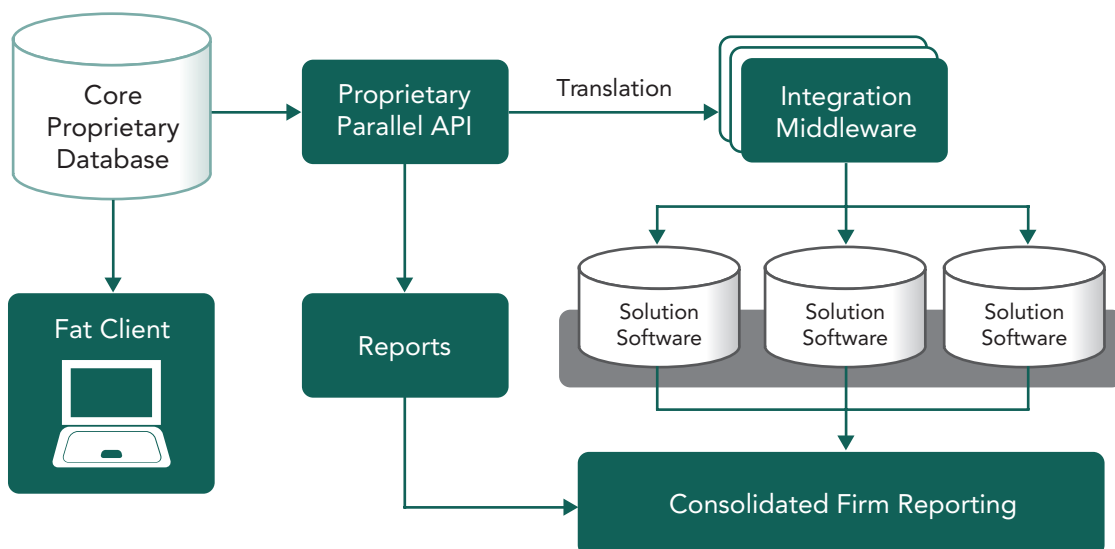
Denise Valentine, Senior Analyst at Aite Group

As the industry has evolved, varying needs have been addressed around “build or buy.” Technology growth has caused many software solutions to be created in-house; most begin with a vendor as an initial partner and are then spun-out to be sold in the market place. The market has grown to include many niche competitors to address the specific needs of clients. Additionally, as the market has changed, businesses have adapted or expanded their investment strategies. For example, many hedge funds have expanded into private equity, either by virtue of opportunity or on the default of their distressed debt. Private equity firms have begun to search for prospective investments in the credit markets and traditional asset managers have rapidly entered into the alternative asset space.

While many technology solutions meet the demands of the most complex funds, they often do not satisfy their growing requirements. Critical business needs, even within the same firm, can differ and evolve in unique ways as a fund expands into new strategies. This has led many hedge funds to build and integrate various technology platforms to form their own enterprise solutions.

Industry Technology Issue

Piecemeal technology solutions can create problems for firms trying to build efficient firm-wide operations. Data is often kept in various databases or files and a disjointed view of the firm requires manual processes and data manipulation to produce insights on the investment history. This process can





involve running reports or extracting data from multiple systems where it is pieced together offline or is reliant on significant system integration. The effort to reduce manual processes steers most firms in the direction of integration; however, this presents many challenges of its own.

Commercial and proprietary systems generally require some degree of custom development to interface with other systems. Unfortunately, interfaces typically do not exist as the systems are designed for different investment needs (i.e. Hedge, Fund of Funds and Private Equity). As technology continues to change, integration with proprietary or closed systems can present a challenge to any ambitious developer.

A system's extensibility is limited or unavailable through a programmatic interface or file upload. This places a heavier workload on operations staff who have to manually duplicate data and/or perform off-line data manipulations to feed data into downstream systems. Aside from the additional time investment, the manual work can counteract or underutilize the original business purpose of the solution, creating operational inefficiencies. In some cases, firms have employed their own development staff to create and maintain custom interfaces that combat these manual efforts. However, proprietary technology and legacy architecture forces them to create patchwork solutions that often require manual intervention and heavy maintenance.

In view of these limitations, flexible technology has become a large part of the new system selection process. In today's market, finding a system that will fit the company's infrastructure is a key decision point in the overall evaluation; platforms with closed proprietary architecture do not easily integrate into client systems and data will often not run freely between systems. Functionality may be underutilized due to non-existent technology end points or platform restrictions.

Many software vendors have created Application Programming Interfaces (APIs) wrappers around the core of their application in order to resolve this issue. A parallel set of business logic is created to programmatically expose functionality that was previously restricted to the user interface. These APIs, while solving some integration issues, present many more problems themselves. In many instances, there are differences between the logic in the API and the user interface itself. Validations in the API may not match the user interface, possibly leading invalid data to be unknowingly entered into the system. Additionally, as enhancements are made to the software application, they need to be replicated within the API to assure consistency. Unfortunately, this is not always the case, causing both bugs and invalid data to be passed between systems.

Implementations of unrelated platforms can become costly as integration issues between various platforms arise – causing a higher probability of failure. More importantly,

legacy and proprietary technology platforms are known for their heavy dependence on the vendor around platform integration and customization. Vendor reliance can dramatically increase the total cost of ownership – and such costs are not always taken into consideration during the system selection process. The anticipated annual cost of software can dramatically increase when seemingly modest requests are made to the vendor.

The Solution to the Problem

Although no system can entirely handle all the needs of the most complex funds, SunGard VPM's open architecture simplifies the integration within the client infrastructure and optimizes a firm's straight-through processing. This allows the system to easily integrate within the firm's infrastructure and automate all external processes and inherent functionality. An open system simplifies integration, whether data is going in or coming out.

VPM's SQL Server database contains hundreds of stored procedures: base procedures, report specific procedures, and a full set of data extracts. Data can be pulled from a full set of information available from data extracts in the database and fed into other systems. The open architecture exposes all database elements so data within the system can be extracted in either standard or custom data extract, without the knowledge of proprietary technology.

For data coming into the system, the services are completely exposed. The service layer facilitates the sending of any piece of data into the VPM system. There are no limitations when integrating with other systems. Action performed in the user interface is sent as requests to the service layer, which completes the proper validations and actions. The client has full access to not just the user interface but to this service layer as well. Any action that can be taken in the user interface can be programmatically achieved over the centralized service layer. VPM's

service-oriented architecture allows for easy integration with and full access to any part of the system.

The system's open architecture and standard technology simplifies customization efforts. The open nature of VPM allows users to modify reports using tools like Microsoft's Report Builder® 2.0 and Microsoft's Excel®. Business users can utilize the Excel® platform and pull the data directly from the database, providing the flexibility of Excel while maintaining the data integrity of an enterprise system. As the SQL Server is the core of the platform, the creation/modifications of reports, extracts, and jobs can always be managed using SQL itself – there is no need for proprietary knowledge.

VPM's industry standard architecture provides the vendor the independence asset managers have been searching for. The SQL platform is widely respected within the industry and the service layer of the system is technology agnostic. The services are written in C#; however, other languages, including those not on the .NET Framework (i.e. Java, C, and Python), can communicate with VPM's service layer. Clients can utilize their own in-house expertise without being restricted by their chosen software solution. With no reliance on proprietary technology, any development firm will be able to provide resources. The ability to have vendor independence reduces the total cost of ownership. VPM's underlying technology enables clients to take software customization into their own hands while allowing them to reduce the total expense of the solution.

Understanding the Design and Architecture

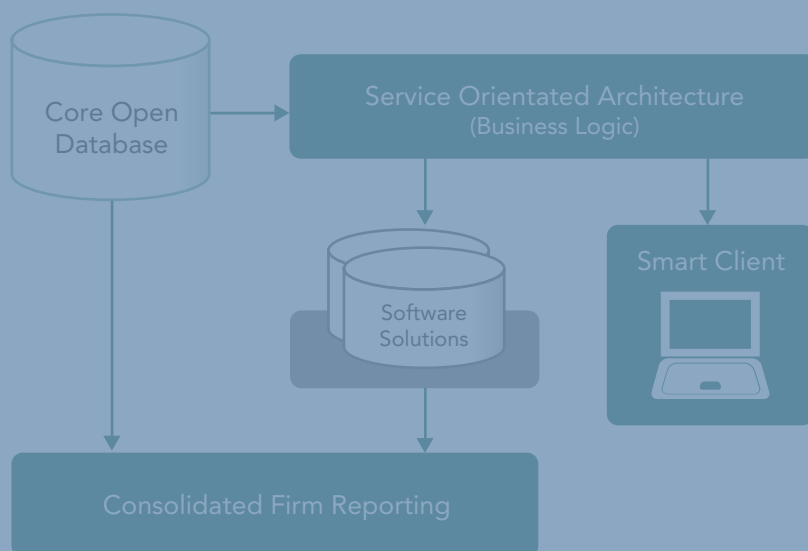
Software design and architecture have evolved to allow systems to be more extensive. One of these designs is a service-oriented architecture (SOA). In a SOA, the system is designed to have the main business logic residing in loosely-coupled, interoperable and reusable 'services' that are easily consumed by clients. By adopting this approach, it enables processes and behaviors to be exposed in a

manner that can be consumed from many business applications, allowing systems to easily integrate with other software systems. The services in the SOA are smaller, highly re-usable amounts of business logic written in the business domain, not the data domain.

VPM, a hedge fund accounting and reporting solution, is built on industry standard technology. The core of the system is architected on Microsoft's SQL Server platform; the database is supported by the SQL database engine and reports utilize SQL Server Reporting services. The system architecture is open to and accessible by a multitude industry tools.

The business layer of the application is in a SOA. The services are written on Microsoft's .NET Framework, using C#, and hosted on Windows Communication Foundation (WCF). The platform is technology agnostic, so any language which can communicate with a web service can access VPM's services. The centralized service layer encapsulates all business logic within the system, presenting one consolidated layer for all system access. The client for the application is a consumer of this logic just as with any other piece of a client's infrastructure.

The VPM's desktop client is a Smart Client. It is a mixture between a fat client, an application where all business logic is directly held within the user interface, and a thin client, where no business logic is stored within the client and is instead entirely stored in a service layer. In the Smart Client all the business logic is in the centralized service layer; however, the client does contain certain logic to help optimize the use of the platform (i.e. defaulting fields on data entry). The Smart Client is built on top of the services to greatly increase the usability of the platform. A third-party development team can rewrite the entire user interface on top of VPM's services and have all the same business logic and



validations. Architected in a model-view-view-model structure on Windows Presentation Foundation (WPF), the client provides many tools to enhance the experience of the end user. The application provides many tools to enhance the usability of the application, including data grid controls for data mining techniques and window management for user customization.

Conclusion

An open, service-oriented architecture allows investment firms to freely grow their infrastructure. It optimizes straight-through processing and "future proofs" the technology of the firm. Any integration between platforms can be built to streamline operational processes, without any restriction of dataflow. A centralized service layer simplifies the infrastructure of the firm, negating the need for wrappers or additional layers to expose functionality. Offering clients access to the core of the system allows configuration and customization to be developed with ease and gives the ability to utilize standard end user tools (i.e. Excel® and Report Builder® 2.0). The commodity skills needed to communicate with the system can be freely accessed within the open market, which promotes vendor independence for all clients.

www.sungard.com/vpm/learnmore

About SunGard's VPM

SunGard's VPM is a comprehensive, multi-currency back-office solution and transaction repository, and is designed specifically for hedge funds. VPM supports virtually any asset type including equities, fixed income, futures, bank debt (including multi-currency revolvers), repo and swaps. In addition to managing virtually any asset type, VPM provides easy-to-use navigation and the ability to integrate with a variety of systems, as well as external data and information vendors.

For more information on VPM and SunGard's portfolio of alternative investment solutions, visit www.sungard.com/VPM/learnmore

About SunGard

SunGard is one of the world's leading software and technology services companies. SunGard has more than 20,000 employees and serves 25,000 customers in 70 countries. SunGard provides software and processing solutions for financial services, higher education and the public sector. SunGard also provides disaster recovery services, managed IT services, information availability consulting services and business continuity management software. With annual revenue exceeding \$5 billion, SunGard is ranked 380 on the Fortune 500 and is the largest privately held business software and IT services company.

For more information, please visit SunGard at www.sungard.com.

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