

Towards a Hedge Fund Infrastructure Blueprint

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Abstract. The hedge fund industry has been around for something like five decades. Following the new regulations imposed by the Volcker rule and others similar in nature, hedge funds look to be fairly strongly positioned to stay and likely grow as an alternative investment vehicle attempting to potentially replace parts of the trading aspects formerly conducted within investment banks. The infrastructure used by hedge funds varies widely by factors such as size of the organization, region and investment focus. While a certain amount of consideration has been given academically, it is by all accounts at a fairly incipient stage. This paper comes to consider and articulate the challenges that a modern, post-Sep 2008, hedge fund needs to consider to ensure it is able to compete and perform at a high level of competency from a technology, infrastructure and operational point of view, being from many points of view subjected to comparable requirements to trading operations within investment banks from a few years back.

Keywords: Hedge Fund, Technology, Infrastructure

1. Introduction

As hedge funds increasingly look to the institutional market for asset growth, they must equip themselves to fit the high expectations and conservative attitudes characterizing institutional investors, concludes a white paper released recently by SEI (Nasdaq: SEIC), titled "Five Critical Challenges for Hedge Funds Taking Aim at the Institutional Market" (SEI, 2007). Advisors studies (Chapple, 2009) show that valuation and operational risk considerations have now become very important in awarding and securing institutional investors for most hedge funds.

According to the SEI analysis hedge fund assets under management have been growing at a compound annual rate of 26% since 1990, with much of that growth coming from the institutional market. "To maintain that growth trajectory, the hedge fund industry will need to branch out from its traditional high-net-worth, foundation, and endowment clientele to serve the broader institutional market," said Paul Schaeffer, Managing Director of Strategy and Innovation for SEI's Investment Manager Services division. "But to compete for those assets, the industry must recognize that large institutions have a distinct set of demands concerning issues such as the quality of infrastructure, transparency, and risk."

The report is based partly on a survey of more than 100 institutional investors by SEI and the research firm of Infovest21. The SEI analysis details growing institutional acceptance of hedge fund investing. Forty-seven per cent of the institutions surveyed said they already invest in hedge funds. Within that group, 73% of pension plans and 55% of institutions overall said they had increased hedge fund allocations over the last several years. Portfolio allocations to hedge funds averaged 30% for endowments, 13% for pension funds, and 24% for institutions. Such forecasts are also presented by other studies such as (CaseyQuick, 2009).

At the same time, institutions expressed continued concerns with hedge fund investing. "Headline risk" was named by 37% of survey respondents as their biggest worry, followed by lack of transparency (19%) and poor performance (15%). Institutions also remain cautious in selecting hedge funds, the survey found, devoting an average of seven months to due diligence and 12 additional weeks to approval.

In the paper, SEI identifies five challenges hedge funds should address in order to attract more institutional assets:

1) Demonstrate institutional-quality infrastructure and operations. Infrastructure was ranked the number-one criterion in hedge fund selection, with 46% of those surveyed naming it most important. Of

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those who responded this way, 54% said it was because "better managed firms produce better returns." The quality of fund administration was a prime concern. Of those respondents most concerned with infrastructure, two-thirds said it is unacceptable for funds to handle their own administration internally, and half demand a "big-name" administrator; 81% said they take steps to verify that hedge fund investments are valued independently.

2) Meet investor demands for reporting and transparency. The lack of transparency was the second most commonly cited worry with hedge fund investing, with 19% of institutions ranking it number one. This concern was greatest at the strategy level, with 85% of respondents saying they would not invest in a strategy they do not fully understand. More than half said they seek portfolio transparency at the industry or sector level, and one-third were most concerned with transparency of the investment process. Only 11% said they seek transparency of specific investment positions.

3) Build stable management teams with a full range of skill sets. Interviewees ranked "people at the firm" as the third most important factor in hedge fund selection, surpassed only by "firm infrastructure" and "performance." Other survey responses revealed that investor concerns with hedge funds' organizational stability and staffing are not confined to those making investment decisions, but cut across all key management and support positions.

4) Shift focus from performance to investment disciplines. Institutions are as concerned with investment process and risk profile as they are with the level of absolute returns, the survey revealed. Interviewees ranked "consistent, stable returns," "uncorrelated returns," and "high risk-adjusted returns" as more important objectives than "high absolute returns." Seventy-two per cent of interviewees said the investment strategy, rather than performance, is their starting point for hedge fund selection.

5) Keep abreast of public policy and regulatory trends. Citing on-going deliberations over hedge-fund-related regulation, tax policies, and accounting rules and investor concerns with "headline risk," the paper urges the industry to "commit whatever resources are needed to ensure that hedge fund managers meet the highest possible standards for their overall compliance and general business practices."

Clearly the trend towards an institutional level infrastructure is very pronounced (Kundro, Feffer, 2010) and should be expected to only grow going forward, therefore increased the subject warrants increased study and consideration.

"The take-away message is that institutions clearly prefer to do business with institutional-style organizations," concluded Schaeffer. "For hedge funds, the challenge will be to fit the profile of an institutional-quality fund while preserving the performance attributes that attracted major investors in the first place. Technology platforms have often been developed on a piecemeal basis - pulling data from multiple systems is inefficient and not scalable. Addressing data requirements and the right technology infrastructure should be part of any firm's future growth strategy." (SEI, 2007).

2. Hedge Fund Infrastructure

When considering a hedge fund infrastructure, one of the most important factors that the architect needs to start with is the set of instruments that the fund will be trading. The infrastructure required will be very different for a long-short hedge fund trading only stocks and for a complex multi-asset hedge fund which cover a wide variety of financial instruments. For the purpose of this discussion we will be considering the requirements of a hedge fund that covers a cross-asset area of instruments and which will be using several brokers to transact with as well as several prime brokers to settle and clear positions through. The fund will be using however a single fund administrator for the reconciliations, collateral and margin management and NAV (net asset value) production. The current trend is to outsource a significant portion of the adjacent functions but for the purpose of this discussion we will simplify these considerations and will simply include or not in the conversation the systems/functions or data feeds required (Paladyne, Broadridge, 2009).

As an exhaustive consideration of the subject is no doubt requiring more space than available for the purpose of this presentation a number of details will be missed, which we consider acceptable as long as the paper succeeds in presenting the guiding lines of establishing the infrastructure for a given fund and in presenting the core of the setup while leaving for further clarification and diversification a fair number of

aspects that may involve specialized functions such as high frequency trading, in-detailed risk reporting for example.

The type of instruments that we assume to be traded in a hedge fund considered for this study will include at least the instruments in Table 1.

Table 1. products covered by hedge fund

Equity Volatility	Listed & OTC options incl. multi-leg strategies and basket of options Light exotics – barrier options Variance Swaps, Volatility Swaps, forwards & synthetics Convertible Bonds
Equity Delta One	Futures and calendar rollovers (Sector, Dividend, Single Stock Future) Total Return Swaps, Forwards on single names, indices ETFs, Cash Equity Blocks Program Trading, EFP
Commodities	Linked Notes, Total Return Swaps Listed F&O
Fixed Income	CDS indices and single names Listed bonds and money markets F&O FX

The main components of the core architecture for a hedge fund are detailed in Fig. 1.

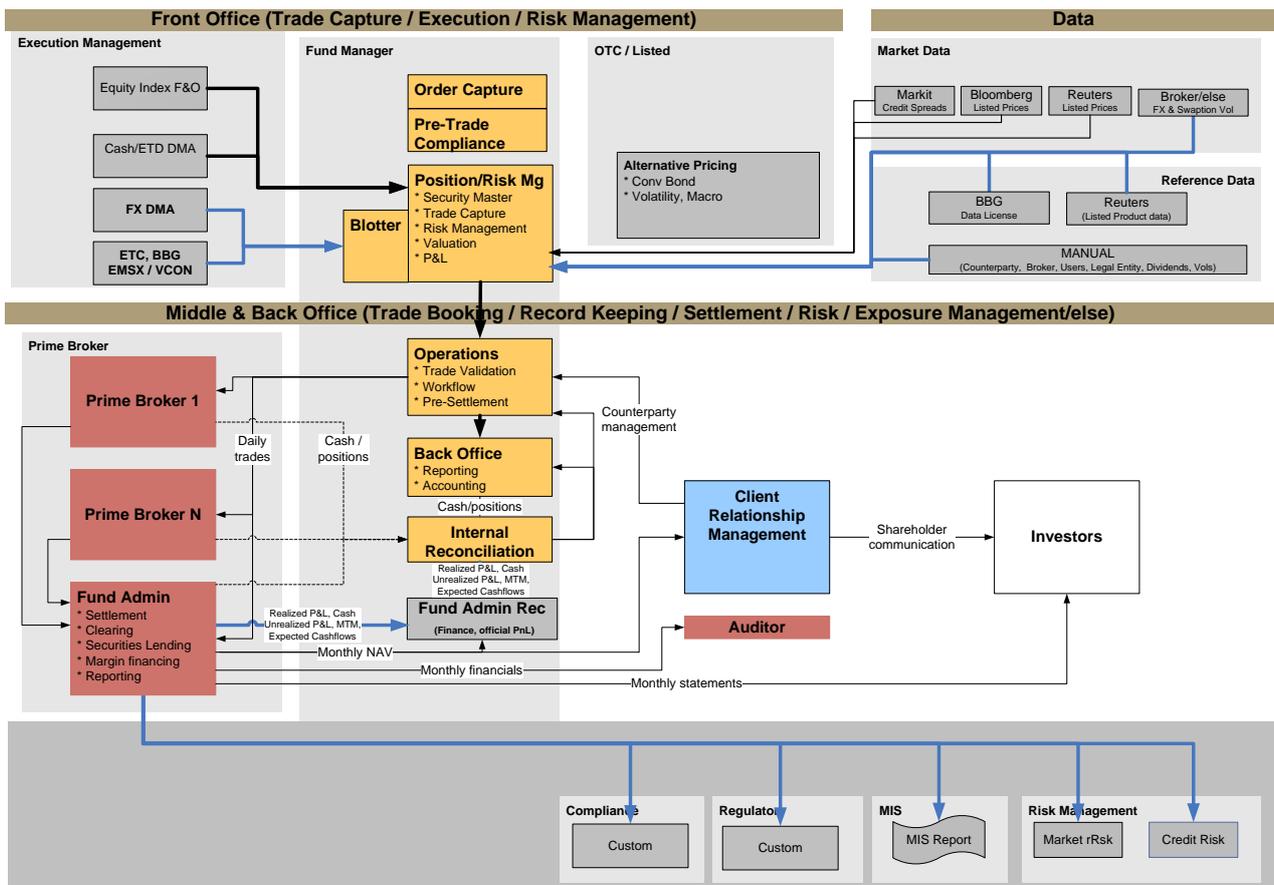


Fig. 1: Hedge Fund infrastructure architecture

The system architecture for a hedge fund can be broken down on the vertical (front/middle/back office/corporate) areas, as well as horizontal (execution management, position and risk management, OTC/listed trading, reconciliations, settlement, etc.) areas.

The main areas identified in terms of systems architecture include Front Office, Middle and Back Office, Corporate and Data management.

2.1. Front Office (Trade Capture / Execution / Position & Risk Management)

Front office systems include functionality allowing traders to interact with listed markets (execution management systems), capture orders and manage positions and risk (position and risk management systems, with adjacent features such as blotter/else), OTC / Listed alternative pricing systems (specialized systems per product type). Data management is shared among all vertical and horizontal areas.

Significant support is required as well in the area of research as well, mainly for technical research, but also fundamental research, depending on the degree of evolution of the fund manager.

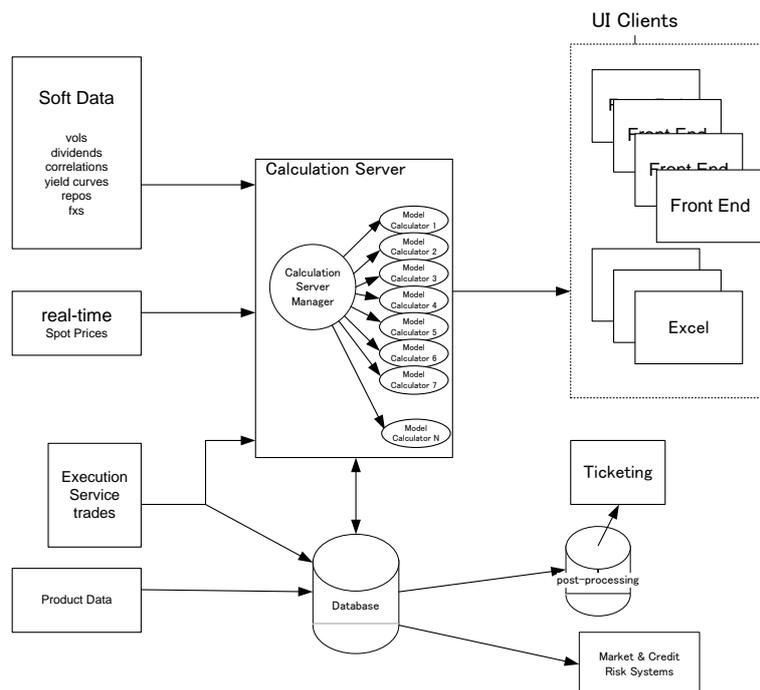


Fig. 2: Position and Risk Management system

For the scope of this presentation we will concentrate on describing the functions of the position and risk management systems, as presented in Fig. 2.

Calculation Engine & Pricing Models are responsible for aggregating all the data required (instrument static & dynamic data) in order to calculate the fair values of the products transacted.

Position Engine is responsible for ensuring that an accurate account of the current positions is maintained during the life of a financial product. The engine maintains all positions and marks for the entire trading period, records each trade accounted for during the day, and end of day position information needs to be saved in the database in order to be loaded again the next day.

Instrument Static Data service is responsible for storing all the data parameters that represent the contractual details for the products transacted.

Dynamic Data: volatility, dividend, yield curves, repo data needs to be maintained in a controlled and disciplined manner. The method of inferring the data is also very important as it directly affects valuation of products requiring the data.

Price formation is a very important component for most areas of the business and requires a high degree of attention and scrutiny from outside the actual trading group. All parameters that feed into the pricing

models need to be *verified*. Pricing models themselves need to be validated through thorough testing. The *accuracy and latency* of the entire *price flow* for underlying instruments from exchanges, through the internal distribution layers and into the pricing engine requires great attention. Price formation is one of the areas where a great deal of attention and time is spent when implementing systems dedicated to hedge fund.

Order execution is another area where the accuracy and timing of the information is very important as this is the area where all order are being sent out to the exchange or broker platforms, and any errors not detected up until this stage will have a direct impact on investors and the agent. Mistakes in this area may bring monetary costs that can be more or less significant, and in extreme cases may even lead serious consequences for the fund.

2.2. Middle & Back Office (Trade Booking / Record Keeping / Settlement / Risk / Exposure Management/else)

In the area of middle and back office the roles are split between internal and external parties. Internal parties include internal operations while external parties to the fund include prime brokers, fund administrator and transacting brokers. In terms of internal parties the focus is on: operations (trade validation, workflow, pre-settlement), back office (reporting, accounting), internal reconciliations (trade rec, positions rec, PNL rec, mark-to-market rec, cash rec). The prime brokers (of which there may be multiple, despite the name of “prime”), the main tasks are those of funding, margin management, settlement and clearing). For the fund administrator the main tasks include settlement, clearing (against all prime brokers and brokers) as well as margin, collateral management and reconciliations against all parties, plus the production of the NAV (net asset value) for the fund, which is to be reported to investors.

Further support is required for CRM systems (client relationship management) and regular investor communications.

2.3. Corporate Services

Corporate interfacing areas include compliance, regulatory reporting, MIS (management information systems) as well as risk management (from a corporate, rather than trading, perspective).

3. Conclusions

In this paper we present a sample system’s architecture that multi-asset relatively complex funds may use to support the business on an institutional platform. We considered the driving factors (such as institutional investors which require sound platforms and practices), the emergence of the hedge fund industry as a platform that offers superior returns for high net-worth individuals in an environment where more traditional vehicles are being cosseted by increased regulation and the way that when all these components come together, relatively complex and even sophisticated approaches, on par or sometimes exceeding investment banking system’s standards come to reshape the industry.

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