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DATA WAREHOUSING IMPLEMENTATION IN HEDGE FUND ADMINISTRATION INDUSTRY

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ABSTRACT
This research work tried to provide an outline specification for scope of implementation of data warehousing. This model is targeting industry as a whole and covering general system and data sets which are minimally required by each and every hedge fund administrator, however based on geographical location and changes in regulatory conditions, macroeconomic environment across the globe and software, networking and hardware technical advancements and security led to open doors for further study and research according changes in trends and scope as we discussed. Few areas identified can be classified as: Technical Scope, Financial and budgetary changes, Changes in regulatory process, Change in macroeconomic environments, Changes in accounting terms, Information Security.

KEYWORDS: *Data Warehousing, Hedge Funds, Extraction, Administration, Trading*

INTRODUCTION

As investment across various asset classes are growing day by day hedge funds as a private investment funds playing a major role in growth of money markets. A hedge fund is a group fund open to few or limited number of investors that perform a wider range of investment and trading activities. Incestor pays a performance/management fee to its fund manager. Hedge funds invest in multiple investment strategy that determines the type of investments and the methodologies of investment. Hedge funds invest in a vital range of investments including stock markets, debt, commodities, CDS, currencies and real estate etc.

REVIEW OF LITERATURE

Hedge funds are proficient to advertise securities diminutive and to acquire securities on influence. At the same time as this movement is not exclusive to hedge funds, hedge funds frequently use influence forcefully. Hedge funds administration is the fastest growing industry with rapid growth of money markets and alternative investment funds. Every day new hedge funds and private equity funds are emerging in markets. Every fund itself cannot afford IT infrastructure and a team of dedicated professionals specialized in financial accounting, risk analysis auditing, and investor's database maintenance. Management at hedge fund has to concentrate on his business while shifting all accounting, investor reporting, portfolio management, and risk and performance analysis etc. tasks to hedge funds administrator. They can have fun a function in financial modernization and the reallowance of financial threat. Some hedge funds have the probable to interrupt the implementation of fiscal markets.

Hedge funds can offer profits to financial markets by ornamental liquidity and efficiency. Additionally, they can play a role in financial innovation and the reallocation of financial risk. However, some hedge funds, like other large highly leveraged financial institutions, also have the potential to disrupt the functioning of financial markets. Its responsibility of hedge fund administrator to provide accurate and quality repots and data to hedge funds so that analysts and investor can take right decisions about their investments and can make their business profitable. A well-managed data warehouse at IT department of hedge fund administrator is capable to meet out all such requirements. Proper implementation methodologies and well defined processes and structure help not only existing staff of organization but also helps new comers to quickly adopt and understand the system. Further since everything is well defined and modification to the system will also become easy to implement.

The Hedge funds are a single example of a gathering of institutions that aggressively trade securities and unoriginal instruments. An appraisal of the community strategy concerns created by hedge funds strength consequently advantage from a deliberation of hedge funds in the broader circumstance of trading movement. In today's financial system, the marketplaces for operated securities are performing arts, a gradually more significant function in the intermediation of recognition. The varied compilation of

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organizations, together with hedge funds that connect in dealing movement can be distinguished by similarities in their make use of mark-to-market regulation, influence, and energetic trading.

About hedge funds administration industry: A hedge find administrator can also be defined as a service provider who provides accounting and financial services along with various type of analytical reports and data management service for both investors of hedge funds and fund managers.

Administrators play a major role by providing the operational infrastructure of a fund that meets the needs of hedge funds. Fund administrators see this as the opportunity to create a service offering that is integral to a hedge fund's investment process.

The processes that a hedge fund administrator performs are: Investment data processing, Reconciliations of data both collected from brokerage houses and fund managers and compiling it in information format, Portfolio pricing and management, Fee computations live management fees redemption fees etc., Investor related activities like investor account statements, NAV reporting, documents maintenance and Reporting.

RESEARCH METHODOLOGY

Research work was conducted at NAV Back office IT Solutions (P.) Ltd. Jaipur (India) which is a back office of NAV Consulting INC., Chicago, USA. Starting point of the work was identification of various asset classes which are being used by hedge funds for investing, identification of various accounting formula commonly used in reporting like rate of returns, risk analysis, performance analysis, exposure, position etc. reports.

Commonly used database structure was designed which is to be consumed across various applications which are being used by hedge fund administrator organization.

Prepared various use cases to be implemented over data and various commonly needed reporting formats were designed and collected. A critical study was done for identification for vendor specific warehousing tools and its implementation.
Finally, a common proposed model was established in this research with perspective of data warehouse.
This research work may bring following business advantages for a hedge fund administrator:

- Well defined data collection mechanism
- Centralized Data Repository for all operations
- Efficient and quick retrieval of information
- Business Intelligence
- Boost in Query and System Performance
- Improved Data Quality and Consistency
- Historical Intelligence and Data mining
- High Return on Investment

Research work also explored Data warehousing methodologies and formulas for aggregation etc. with few business case studies and various vender specific data warehousing solution available in market. As a part of research work main data sets in from of tables were identified, this was essential to manage data of hedge funds. Research presented a commonly used database and structure for hedge fund administrator.

Finally, a model was presented by integrating information collected and system identified during research. This model is suitable to fit in any small to large-scale administration service provider and along with data warehousing it also explores utility software and web sites required for successful operation. Thus bringing this research work for commercial benefits and converting in real time system will be very beneficial to hedge fund business. This research work can work as a base line draft for an administrator.

DATA WAREHOUSING

A data warehouse is a repository of an organization's electronically stored data. Data warehouses are designed to facilitate reporting and analysis. This definition of the data warehouse focuses on data storage. However, the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary are also considered essential components of a data warehousing system. Many references to data warehousing use this broader context. Thus, an expanded definition for data warehousing includes business intelligence tools, tools to extract, transform, and load data into the repository, and tools to manage and retrieve metadata. A Data Warehouse is a record used for exposure and investigation. The Data Warehouse centers on data storage. From the prepared systems the data stored in the warehouse is uploaded. The data is used in the Data Warehousing for reporting. The Data Warehouse uses dramatization, amalgamation and right of entry layers to accommodation its solution purposes. The dramatization layer stores raw data, the amalgamation layer integrates the data and shifts it into hierarchal groups, and the right of entry layer helps users to

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retrieve data. Data Warehousing includes business intelligence tools, tools to remove, convert and fill data into the depository, and tools to manage and salvage metadata.
The across the world admitted meaning of a data warehouse urbanized by Bill Inman in the 1980s is "a subject-oriented, integrated, time variant and nonvolatile collection of data used in strategic decision making". The data warehouse proceeds as the essential position of data incorporation that is the initial stair in the direction of revolving facts into information.
Significance of Data Warehousing for a hedge fund administrator**:** An administrator manages so many funds at the same time so he has to have data warehousing infrastructure in its organization. Huge data storage capabilities, fast and accurate data retrieval and reconciliation, being able to record each and every trade being done by fund managers, maintain individual investor's record, multidimensional and analytical reporting needs makes data warehousing best implementation candidate for a hedge fund administrator.

There are two most important advances to storing data in a Data Warehouse are:
The Dimensional Approach: In this approach the data warehouse should be modeled using a Star Schema or Dimensional Model. The transaction data are paneled into either facts i.e. numeric transaction data or dimensions which gives framework to the facts. The main advantages of this approach are:

- The Data Warehouse is easy to understand and to use.
- The Retrieval of data from the Data Warehouse tends to operate very quickly.
- As the organization is separated into dimensions or specifics and circumstance or dimensions.
- The disadvantages of the dimensional advance are as follows:
- For maintaining the reliability of facts and magnitudes loading the Data Warehouse with data from different operational systems is convoluted.
- If the association adopting the dimensional advance alters the mode in which it does dealing, modification of the Data Warehouse structure is difficult.

The Normalized Approach: This approach is also called as the Third Normalization Form model and in this approach the data warehouse should be molded using an E-R model or normalized model. In this approach the data in the Data Warehouse are accumulated the following rules of database normalization. The normalized arrangement separates the data into entities which are used for creating various tables in a relational database. The main advantage of this approach is to add sequence of data into the database straightforward and the drawback of this approach is that it can be difficult for users, because there are number of tables involved, both to:

- Join data from different sources into meaningful information and then
- Admittance the information without a clear accepting of the resource of data and of the data constitution of the data warehouse.

Data warehousing has been mentioned as the highest priority project of IT administrative. To maintain the increasing market a huge number of data warehousing technologies and tools are obtainable. For concentrating on the operational data online transaction processing systems are useful but online transaction processing is not suitable for supporting queries or questions of managers in the business. These queries and questions engross methodical including aggregation, drilldown and dicing of data which are sustained by online analytical processing systems.

Data warehouses in this processing system maintain these applications by amassing and maintaining data in multidimensional layout. Data is hauled out and loaded from multiple online transaction processing data resources using extract, transfer and load tools. The metadata accumulates characterizations of the starting place records; data sculpts for objective databases and conversion imperatives of time inconsistency and non-volatility are important for a data store. The trade information representation signifies to facilitate facts and is the organization for all methods' forms, together with the data warehouse representation.

Data marts store subsets of data from a warehouse i.e. the Data Warehouse can be subdivided into data marts. The data in all data mart is as a rule adapted for a exacting potential or purpose, for instance invention productivity examination, KPI analysis, consumer demographic analysis, and rapidly. All particular data mart is not automatically compelling for extra exercises. All selections of data marts have worldwide and exceptional distinctiveness.

The most popular methods of data modeling for data warehousing are:
E-R Modeling: It follows the standard online transaction processing database design process starting with a conceptual E-R design explaining the E-R schema into a relational schema and then normalizing the relational schema.

Dimensional Modeling: This Dimensional Model is cool, calm and collected of an information table and numerous tables. An information table is a dedicated relation with a multi element key and encloses elements whose principles are usually preservative

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and numeric. A dimension table has a solitary element primary key which keeps up a correspondence to one of the elements of the multi element solution of the information table. Star join schema has a star like structure of the substantial demonstration of a dimensional model. This model can be absolute to a snowflake schema by eradicating the stump principally elements in the measurements and insertions of them in part tables which are connected back into the dimension table with reproduction types.

Decision support queries may possibly have need of considerable aggregation and joining in the case of Online Analytical Processing. Denormalization is habitually encouraged in the situation of the data warehouse to improve the performance. A design which consent to announcement, arrangement, continuation, knowledge and reuse is structural design. It comprises dissimilar areas such as: Data Design, Technical Design, Hardware Design, Software Infrastructure Design.

There are several policies for schema design as: Top down, Bottom Up, Inside Out and Mixed. The data warehousing information representation is residential by concerning some tread renovation progression to the trade information representation. These steps are:

- Pick the facts of concentration.
- Insert instance to the explanation.
- Insert consequent facts.
- Establish granularity stage.
- Review facts.
- Amalgamate units.
- Generate arrangements.
- Isolate facts.

There are different types of data warehousing methodologies which are shown in the tables below. The foundations of these methodologies can be off the record into 3 wide-ranging classes: Core Technology Vendors, Infrastructure Vendors, Information Modeling Companies

On the basis of the errands of the data warehousing, we present a position of powers that confine the important facial appearance of any data warehousing methodology.

The primary element we believe is the core capability of the companies, whose methods could have dissimilar prominence depending upon the portion they are within. The sellers of the core methods are those companies which put up for sale engines of the database. The methods/ methodologies we appraise consist of:

- NCR’s Teradata-based methodology
- Oracle’s methodology
- IBM’s DB2-based methodology
- Sybase’s methodology
- Microsoft’s SQL Server-based methodology

The second element i.e. infrastructure vendors comprises those companies which are in the data warehouse communications industry. A communication apparatus in the data warehouse empire could be a method to administer metadata using depositories, to help remove; transfer and load data into the data warehouse or to assist produce customer clarifications.

ANALYSIS

A compressive set of reports is required by fund managers to make their investment decision. Investment strategies depend on multiple factors like sectorial performance of an asset class, business environment, current asset values, position and portfolio risk. Financial market is rapidly changing and dynamic kind of environment where data and decision is everything.
d managers require up to date to information about their past, present and future investments, including performance, portfolio, sectorial and regional exposure, risk, regulatory filings, etc. A data warehouse provides facility to consolidate any portfolio-related data in a single location. The proper storage of this data is the first step toward building reporting tools with an integrated view of all of the firm's information.

The transformational data thus produced from processing stage can be configured to be a centralized for operations, accounting, compliance, finance, risk and exposure management, legal, market data/SIS, and investor relations. The platform comes with connectivity to all major prime brokers, fund administrators, custodians, and counterparties.

Attribution and performance analysis includes the impact of the investment strategy with regard to overall policy, asset allocation, security and activity. Returns on investment are compared to a benchmark in order to determine whether an investment done is proper and profit making or not.

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CONCLUSION

Hedge funds administration is the fastest growing industry with rapid growth of money markets and alternative investment funds. Every day new hedge funds and private equity funds are emerging in markets. Every fund itself cannot afford IT infrastructure and a team of dedicated professionals specialized in financial accounting, risk analysis auditing, and investor's database maintenance. Management at hedge fund has to concentrate on his business while shifting all accounting, investor reporting, portfolio management, and risk and performance analysis etc. tasks to hedge funds administrator.

The responsibility of hedge fund administrator is to provide accurate and quality reports and data to hedge funds so that analysts and investor can take right decisions about their investments and can make their business profitable. A well-managed data warehouse at IT department of hedge fund administrator is capable to meet out all such requirements. Proper implementation methodologies and well defined processes and structure help not only existing staff of organization but also helps new comers to quickly adopt and understand the system. Further since everything is well defined and modification to the system will also become easy to implement. This research will certainly help fund administration service provider to establish data warehousing in its organization. Research will enlist all challenges arises during implementation and their solutions which will help them to go in right direction with a well-planned and defined manner with step by step methodological approach. It will also help an organization to compare or analyze available vendor specific data warehousing tools and their cost effectiveness and suitability for their organization.

This research will also help them to find commonly used database structure targeted to hedge funds industry structure and predefined commonly used MIS and Investor specific reports. Data warehousing is the forefront and most trustworthy technology used today by financial institutions for data management, planning, reporting, and data mining. After the evolution of the concept of data warehousing during the early 90's this technology is growing at a very rapid pace and best suitable for financial institutions like a hedge fund administrator.

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