Using IBM Insurance Information Warehouse to Support Investment Management

Industry Challenges

Insurance organizations must continuously address issues of data proliferation and all of the opportunities and risks associated with managing its analytical capabilities. While big data begins to address how organizations can continuously harvest vast and complex data resources for competitive advantage, it is imperative that organizations maintain focus on the key business drivers required to succeed in today's globalized economy.

Long-term and sustainable business transformation must encompass a deep understanding of customers and their sources of profitability. Furthermore, organizations need to be able to rapidly adapt and report on an ever-increasing list of regulatory and risk management initiatives, such as, Solvency II, Dodd Frank, FATCA, NAIC, and IFRS. They are also required to have a deeper understanding of how organizations need to manage their businesses more effectively, with greater capital efficiency, and the ability to respond to a growing number of regulatory requests.

The outcome from implementing transformation strategies must be the more efficient management of their business, including how they can better manage their own investments and assets. Investment management results in the processing of millions of transactions on a daily basis leading to an expanding ocean of data that requires management and governance.

Insurance companies generally recognize the importance of separating the responsibilities for managing their insurance businesses from managing the investments backing their reserves and capital. Due to the role investments play on an insurance company's balance sheet and the resultant impact on its profitability, the management of these assets is a key function in how an insurance company can create significant value for the company's policyholders and shareholders.

Insurance organizations need to enforce a new discipline of a common and shared understanding of key business drivers that feed decisions at all levels, across all lines of business. This implies that insurance organizations must organize their processes and data management strategies differently. They need to have an integrated approach to the management of risk-related data and processes, to data quality and ownership and to the I.T. infrastructure required to achieve successful enterprise implementation strategies.

Insurance organizations need to achieve sustained long-term competitive advantage by infusing analytics throughout their organizations to drive informed decisions, enable faster actions and optimize outcomes.

The World Economic Forum report "The Future of the Global Financial System, Navigating the Challenges ahead"[1] highlights the need for business models to evolve and transform to survive in a business environment where profits from core business activities might significantly reduce in the years ahead, competition might increase and risk aversion among its traditional customer base increases.

Part of this business model transformation focuses on new investment assumptions, including around assets and investment management. The new investment strategy must counteract the reduction in profits from typical insurance activities but also be in the context of adhering to increased capital constraints as advocated by regulatory standards, such as Solvency II.

The IBM® Institute for Business Value report 'Analytics: A blueprint for value'[2] identifies nine levers that enable organizations to create value from the ever-growing volume of data that requires effective management. These cover capabilities such as culture, data, expertise, funding measurement, platform, source of value, sponsorship and trust. In relation to data, it outlines that true value can only be achieved by those organizations that vigorously govern data facilitating cross-silo data sharing.

They must embed confidence in their data and allow the organization to make that data more widely available and accessible. The report maintains that the most effective way to enable enterprise-wide data sharing and a single view of the customer is through a set of data management standards that establish uniformity in the data where needed, yet are flexible enough for business units to conduct their own analysis.

IBM Insurance Information Warehouse can play a central role in improving data quality, accessibility, availability and governance. These are all key business and technical issues that separate the leaders in in the insurance industry from the pack.

Addressing the Challenges

IBM Insurance Information Warehouse can help with the successful transformation of the business environments of insurance organizations. It can help organizations successfully manage issues such as regulation, competition, and advances in technology. This allows them to anticipate shifts in customer needs and expectations and manage the resulting changes in competitive dynamics.

From an investment management perspective, insurance organizations must rigorously interrogate their data to ensure that the investments on their balance sheets cover all reserve requirements as specified under regulatory initiatives and provide an extra buffer to meet adverse surprises in claims and benefits.

A clear commitment to data quality, accessibility, availability and governance facilitates insurance investment management divisions to manage professionally the funds generated by the insurance business, leading to increased risk-adjusted returns while adhering to stringent regulatory requirements on its assets and other financial constraints.

Organizations must ensure that investment returns are reported on accurately and preserve the solvency, both regulatory and economic, of the insurance organization. There is also the added expectation given the pressure on profitability for organizations to maximize the return on its capital and enable it to continue to underwrite profitable insurance business.

All of these objectives need to be achieved in an era of increased uncertainty with the added possibility of negative returns and write-downs on Eurozone sovereign bond portfolio investments trading on financial markets.

IBM Insurance Information Warehouse provides a structured mechanism for the delivery of long-term and sustainable business value through its pre-built data warehouse solution. It's underlying value is that it facilitates a close alignment between business and I.T. development resulting in the central collection of data across multiple business units and the efficient reporting of investment management requirements.

It also provides a design approach that allows for flexibility as new investment management and regulatory initiatives come on stream. In addition, it provides a mechanism for organizations to understand the importance of data governance and the need for adequate documentation for data and reporting requirements during all stages of an investment management project.

Demonstrating the Value of IBM Insurance Information Warehouse for Investment Management

IBM Insurance Information Warehouse provides a framework for achieving rapid and successful management of a diverse range of analytical capabilities in the investment management space. It provides a glossary of requirements, terms and concepts that can be clearly understood and communicated by both business and IT, helping to identify and improve data sources, accelerate project scoping, requirements gathering and the facilitation of appropriate reporting in the investment management environment.

It acts as a blueprint by defining the structures necessary to build an effective data warehouse, and provides insurance managers with critical prebuilt reporting templates that offer a wide and deep view of their business through key performance indicators (KPIs) and other measures.

It provides comprehensive data structures that enable insurance organizations to build an enterprise data warehouse. If required, it facilitates the development of bespoke data repositories designed to solve a particular need, such as, investment management. It also provides key benefits for investment management projects, including:

- Contributing to better data requirements definition
- Contributing to the eradication of duplicate data across multiple investment management financial instruments
- Contributing to better data warehouse and data mart design and implementation
- Facilitating better design and development of investment management reporting

It supports the principle of "one version of the truth", consolidating your data to a single data source for external compliance reporting, internal risk management and strategic capital allocation. A key tenet of this approach relies on the definition of your data requirements using a common set of business terms. These business terms support the underlying I.T. assets such as data models. This provides consistent terminology and serves as an entry point for the user to understand and customize the information that is supported for related I.T. assets. Some of the benefits to be achieved by insurance organizations by using the models are as follows:

- Using the comprehensive glossary of insurance Business Terms to extend and agree common data definitions faster across your business lines
- Promotes standardization across lines of business using uniform data classifications and relationships that are compliant with Investment Management segmentation
- Facilitating the collaboration of business and technical users by transforming business representations into technical designs resulting in enhanced reporting capabilities from within the data warehouse

In relation to Investment Management, IBM Insurance Information Warehouse now has extensive business term coverage to support a broad range of financial assets. This approach aligns with and goes beyond what is documented in standards such as those outlined by the European Insurance and Occupational Pensions Authority (EIOPA). Among the hierarchy of financial instruments now covered are the following:

- Fund instruments – including commodity, corporate, debt, equity, real estate, index linked.
- Debt instruments – including bills of exchange, guarantees, commercial bills, treasury bills, commercial paper, corporate notes.
- Currency instruments – including spot currency, forward, foreign exchange spot, foreign exchange forward
- Futures – including commodity, currency, equity, interest rate, index

- Swaps – including equity, interest rate
- Options – including bond, interest rate, cap, collar, commodity, currency, equity, index.
- Bonds – including corporate, treasury, municipal, Eurobonds
- Composite Instruments – including mutual fund, units, financial index.
- Capital instruments - common, preference
- Credit derivatives
- Deposit instruments
- Forward rate agreements

Beyond financial instruments, IBM Insurance Information Warehouse now has entity support for the following:

- Asset pricing: Maintains several price quotes, from various sources, for a given instrument and may be stored at the same time
- Asset market information: Maintains the on-going and changing asset market information
- Financial market positions: Identifies and tracks balances of financial market instruments
- Instrument price quotations: identifies reference prices published by a market or financial institution

IBM Insurance Information Warehouse also supports a number of investment management designs for data marts in support of investment management reporting. The designs document high-level groups of business information and are used by the enterprise to fully articulate the requirements for a piece of analysis using their own business terminology. Examples of these analytical requirements related to investment management are as follows:

- Investment analysis: Defines measures required for reporting of investments details of an insurance undertaking.
- Structured products analysis: Defines measures required for reporting of structured products.
- Derivatives analysis: Defines the measures required for reporting of an undertakings derivatives investments.
- Return on investments analysis: Defines the measures required for reporting of asset profitability.
- Investment funds look through analysis: Defines measures required for reporting a look-through approach on investment funds.
- Securities lending and repos analysis: Defines measures required for reporting of exposures to repurchase agreements (repos) and securities lending operations.
- Assets held as collateral analysis: Defines measures used in support of reporting of assets held as collateral.

The value derived from an in-depth analysis of the investment management instruments and their attribution allows you, at design and implementation time, to document efficiently those data elements that are unique to a financial instrument and, more importantly, outlines where there is commonality across instruments, which might be gathered from a multitude of data sources. The analysis requirements documented in the previous section are transformed at design time into common design constructs that can be transformed into separate models for dedicated purposes, such as an operational data store, data warehouses and data marts.

The result of these extensions is that IBM Insurance Information Warehouse can address specific investment management design and implementation challenges by:

- Using and mapping existing data sources and infrastructure to a common Investment Management data definition within a new central data repository, leading to potential I.T. cost reductions and time savings
- Promoting relationships between disparate functional data areas using associations and aliases
- Supporting the principles of clean, reconcilable and transactional data

The flexible design of model constructs provides best-practice modeling for the insurance domain, and promotes better management of subsequent customization and future extensions for an investment management data repository. This results in an improved ability to manage data requirements from various data sources with different levels of data granularity.

IBM Insurance Information Warehouse Components

IBM Insurance Information Warehouse comprises a set of models that enables insurance organizations to build and deliver a business-oriented, enterprise-class data warehouse or data repository.

Business Terms

The Business Terms glossary enables non-technical business experts to describe and define, in their own words, the concepts they use every day. Clearly defined business terms help standardization and communication within an organization. Mappings to the other models make it possible to create a common, enterprise-wide picture of the data requirements and to transform these requirements into I.T. data structures.

The glossary is a comprehensive list of terms pertaining to insurance, financial services and general business that includes:

- Definitions written in plain business language
- Detailed data elements that specify what each business term means for the insurance organization
- Terms that might be related to one another through relationships such as synonyms or aliases

An example specific to Investment Management is Option Instrument. The Business Terms are extended to support this new element and it is defined as:
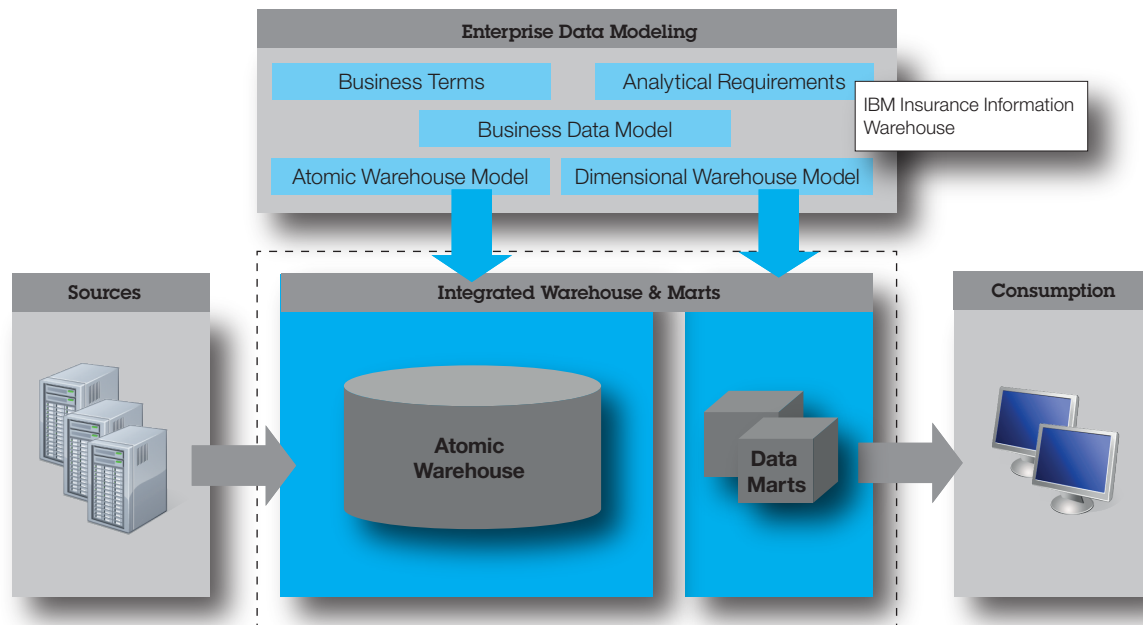
Figure 1. IBM Insurance Information Warehouse solution architecture

'A derivative in which the right (and not the obligation) is granted to the buyer to purchase or sell financial assets during a specified period at an agreed-upon price called the strike price. The terms and conditions applicable to the option are defined in an options contract.'

Further analysis of the core Business Term Option Instrument resulted in the addition of new terms to support a variety of Option instrument types, for example, Bond Options, Future Options, Interest Rate Options, Currency Options, Equity Options. Each of these terms are defined with distinct definitions, for example:

Interest rate option: *'Identifies an option instrument whose underlying security is interest rate security'.*

Currency option: *'Identifies an option instrument that gives the holder the right, but not the obligation, to buy or sell the specified amount of foreign currency at a specified price before a specific date.'*

Analytical Requirements

Analytical Requirements reflect the most common queries and analyses for business performance measurement and reporting, while supporting other analytical functions, such as adhoc reporting and decision support. They enable rapid scoping and prototyping of data marts, which provide a subject-specific analytical layer in a data warehouse solution.

Each Analytical Requirement can be divided into measures, which are numerical facts that convey quantitative information of importance to the organization, and dimensions that categorize measures. These measures and dimensions are mapped to the data warehouse, so that the scoping of the reporting and analysis requirements automatically selects the most appropriate data warehouse entities and attributes to support those requirements.

Analytics development teams can use these Analytical Requirements to create designs for specific data marts or dimensional solutions that can serve as the source for a range of reports and charts.

Investment Management supports a number of Analytical Requirements and these are structured under Investment Management Reporting. One such example of an Analytical Requirement is Derivative Analysis. Derivative Analysis comprises a large number of measures and dimensions.

Examples of measures and their definitions are:

Delta: *'Measures of the rate of change of option value with respect to changes in the underlying asset's price. Only applicable to call and put options and only for contracts still open at the reporting date.'*

Notional amount: *'The amount covered or exposed to the derivative. For futures and options this measure corresponds to contract size multiplied by the number of contracts and for swaps and forwards it corresponds to the contract amount.'*

Number of contracts: *'The number of derivative contracts in the portfolio.'*

Examples of dimensions are: Fund Instrument, Swap, Derivative Contract, Currency, Financial Asset, Credit Rating, Contract Instrument.

Business Data Model

The Business Data Model is a logical model that represents the essential entities and relationships of the insurance industry. It provides a business view that excludes technical implementation considerations such as details related to any specific database.

It is the first point at which the various business requirements are brought together and modeled in an entity-relationship format. It enables organizations to perform the initial modeling of their business requirements and helps the organization understand the various constraints, relationships and structures that can be implied in their business requirements. This is the essential model of the business, providing the overall business context and a common basis for the downstream models that can be used in the actual deployment of the physical data warehouse. The information reflected in the data model is independent of organizational structure and has been validated by multiple sources within the industry.

The Business Data Model extends the analysis work previously completed into design level constructs to support investment management reporting. This results in an enhanced hierarchy of financial market instruments represented in the form of an entity-relationship diagram. Extending the example discussed earlier, Options and their associated sub-types are now represented as in Figure 2.
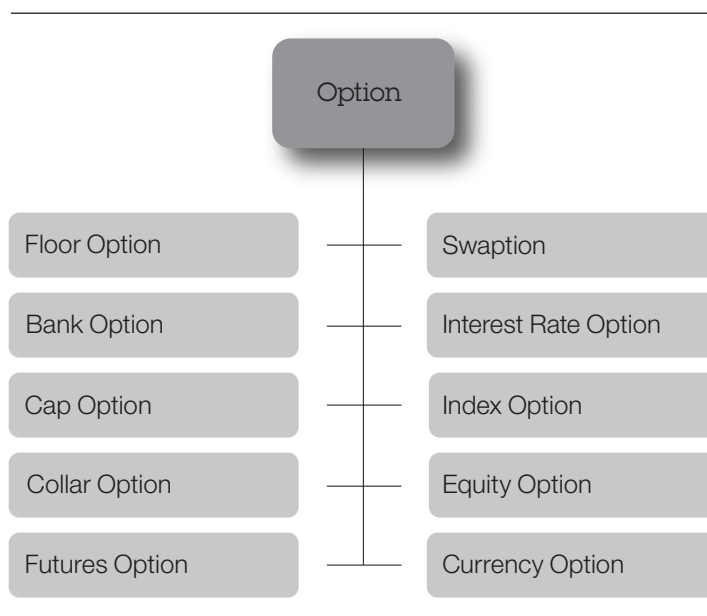
Figure 2. An example of the modeling of business concepts in the Business Data Model

Atomic Warehouse Model

The Atomic Warehouse Model is a logical, specialized model derived from the Business Data Model. It is optimized as a data repository that can hold long-term history, usually across the entire enterprise.

It provides the data design support needed to create a uniform model of the enterprise-level business requirements defined by the Business Data Model as specific, flexible and efficient structures dedicated to the long-term storage of historical facts. It features a flexible atomic data area (primary data storage area) as well as the typical summaries needed by most insurers to roll up the detail data for analysis purposes. A portion of the Atomic Warehouse Model is generated in the initial project phase. Other areas can be generated as the insurer covers more business areas over time.

The design level representations in the Business Data Model are further rationalized in the Atomic Warehouse Model resulting in a more efficient and flexible structure where core concepts and their subtypes as defined in the Business Data Model are rolled up into core entities. For example, Option. This is consistent with the approach advocated by EIOPA.

Dimensional Warehouse Model

The Dimensional Warehouse Model is a logical model derived from the Business Data Model and the Analytical Requirements and provides an optimized data repository for supporting analytical queries. It provides the data design support needed to transform the enterprise-level business requirements in the Business Data Model into business-specific and efficient structures dedicated to the design of a dimensional data repository.
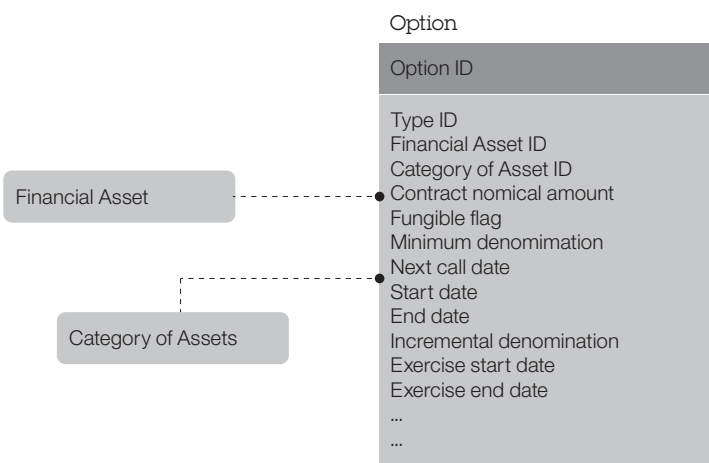

Figure 3. An example of the modeling of entities and relationships in the Atomic Warehouse Model

This repository holds sufficient and complete data to meet the needs of business user analysis. Dimensional models are easily understood by business users. They are optimized for data querying rather than for transactional speed, and their structure makes it is easier to extend them to support new data requirements. New queries can be created without having to redesign the data structures, while old queries can still operate without change. The Dimensional Warehouse Model contains star schema style dimensional data structures organized around fact entities that support the Analytical Requirements.

In support of investment management, there is improved attribution on the financial instruments dimensions included in the Dimensional Warehouse Model. For example, the Derivitives Fact entity contains the same attributes (delta, notional amount) as were mentioned in section on Analytical Requirements.
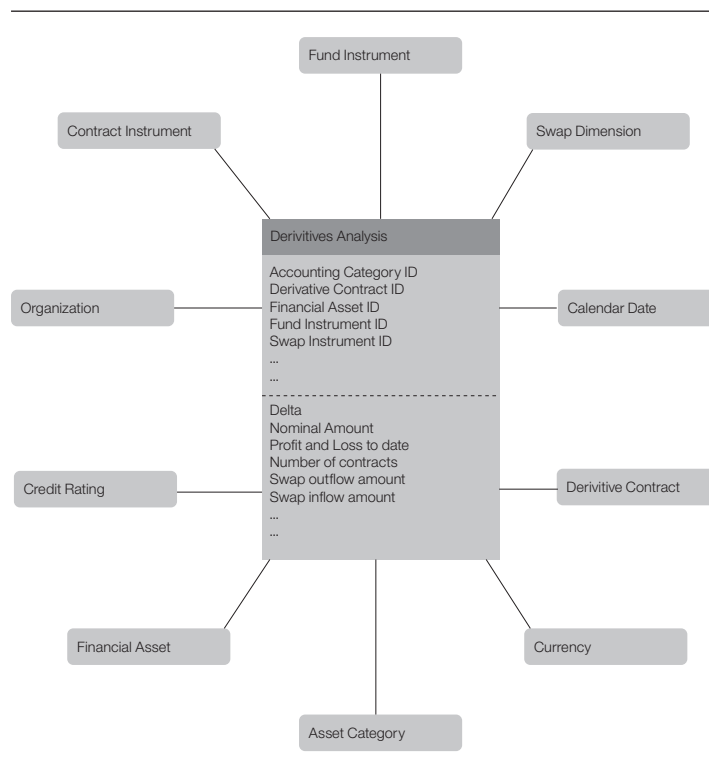
Figure 4. An example of the dimensional star schemas in the Dimensional Warehouse Model

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[1] "The Future of the Global Financial System. Navigating the Challenges Ahead." A World
Economic Forum report in collaboratoin with Oliver Wyman. http://www3.weforum.org/docs/
WEF_FutureGlobalFinancialSystem_Report_2010.pdf ©2010 World Economic Forum.

[2] Balboni, Fred; Finch, Glen; Rodenbeck, Reese; Shockley, Rebecca. "Analytics: A blueprint for
value. Converting big data and analytics insights into results." IBM Institute for Business Value,
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