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Introduction to the Needs and Challenges for Data Management in the Insurance and Reinsurance Industry

Given the large volume, variety and velocity of data in any market, any industry that can manage their organizational data flow is in a stronger position then their competitors, and this provides a huge potential to improve their bottom line. Furthermore, businesses in the insurance and reinsurance industry can increase their systematic approach to quantify and qualify risks through data-driven decisions and risk-profiling techniques. Fueled by the massive availability of internal and external data and more robust decision support systems, the capacity of this industry to increase their understanding of risks and opportunities in markets by creating more advanced statistical models and using predictive analytics, is reaching new heights. This will allow companies to maximize the precision of modelling techniques and rules, therefore improving loss ratios, allowing more accurate pricing, increasing productivity, and consequentially growing profitability.

Structural and technological change in the insurance and reinsurance industry ranks high as a potential risk, as data-driven techniques become more widespread throughout the industry, and concern about the industry’s ability to manage rapid change has increased, according to the Centre for the Study of Financial Innovation (1). The impact of change in the areas of distribution and client interface has also seen that the industry is struggling to keep pace with new technologies, alongside challenges for new market participants unburdened by legacy systems. Data and the technology to incorporate this within existing infrastructure is a common theme in virtually all industry reports summarizing the major changes facing the industry.

In trying to manage large volumes of data effectively, organizations encounter several issues faced by any industry. These include: questions of data governance, quality, cleansing, consistency, completeness, security, automation, auditability, transparency and data silos. The big question is whether there are appropriate tools and data management solutions capable of dealing with the issues faced by enterprise level data requirements? This paper suggests there is.
More and More Data: How the Insurance and Reinsurance Industry Benefits from an Expanding Data Universe

If knowledge is the cornerstone to success, then data is the foundation this rests upon. This foundation is easy to see for the insurance and reinsurance industry. Pricing of risk and risk mitigation strategies in general, are based on the precision of forecasts, predictability of events and impact of these associated event on the world around us. With the advancement of computing power, Business Intelligence (BI) tools, accuracy of modelling techniques and simulation methodologies, the insurance and reinsurance industry should be at the forefront of technological adoption and utilization.

Data is the underpinning of this industry. With it, risk and insurance professionals such as underwriters perform catastrophe modelling, quantify metrics for data-driven decisions, advance sophisticated risk-profiling techniques, develop nuanced understanding of market risks and opportunities, perform anomaly and outlier detection, qualify and approximate emerging risks, measure claims metrics, execute fraud analytics, improve econometrics and implement signal processing. However, all these processes, while valuable, are data-centric. They require not only large volumes of data, but a clear auditable trail from source, through validation methodologies, to its use and presentation in analytics to affect risk mitigation strategy, pricing and other insurance and reinsurance business processes.

With the explosion of the data universe, the insurance and reinsurance industry has access to more data than ever. This is increasing at an exponential rate, doubling in size every two years (2). This proliferation of data can fulfill the requirements for the industry, if, and only if, the industry can incorporate this data into its business processes. This is where the awareness of the risk associated with the IT challenges to manage this data is most acute. How can the technology and IT departments of this industry be able to keep up with the demands placed upon them to collect, normalize and validate this large proliferation of data while the business continues to concentrate on their core functions, namely managing risk. The next section will discuss some of the problems these IT departments have when dealing with these expansive and ever-changing data requirements.
Data Requirements for the Enterprise

Data a business might be interested in can be divided into two types: structured/semi-structured data and non-structured data. Non-structured data is data of exotic formats, ranging from photographs and videos to twitter feeds and other social media formats. While this can be valuable to some businesses, the ability to create marketable insights from the analysis of this data has currently been surpassed by the capacity to obtain abundant amounts of it (3). Therefore it will not be discussed in this paper.

In contrast, structured data can be understood through quantifiable metrics, data-driven modelling techniques, measurement of the parameters of existing risks and possible identification and analysis of emerging risks. This data then allows for transparent and marketable insights for businesses. Structured data can be used in almost every aspect of an enterprise’s business, from cost-benefit analysis and more accurate forecast models, to predictive analytics and signal-processing of emerging and potential risks. To be able to use structured data, the ability of a business’s IT department to collect both internal and external data sources must be present.

Data sources can be public, private, third-party or internally generated. Data sources can also be published in an assortment of formats, from Excel, CSV, text, http or https websites, to email and PDF. Sources can be publically or securely available after being published to websites, FTP, emails, local directories and local systems, further complicating the work of the business to scrape, parse and process these variable data sources. Additionally, data collection is further hindered by changes to not only the publishing format, but also in location, time and units, along with many other possible publishing variations. Figure 1 demonstrates the data management challenges today’s businesses face. These include the need to collect from multiple data sources, both internal and external, varying formats and granularities, erratic posting times, along with the numerous downstream systems and processes that data must be provided to. Therefore, it is no wonder that given business data requirements, the ability to collect, process, validate and centralize many data sources is a time and resource intensive process, requiring large amounts of internal resources and specialized and experienced data professionals.

Alongside the challenges mentioned above, enterprise data management also has to contend with the issue of data silos. Each department within a business will typically have data specific to them, and other departments will not have access to it, be it for client confidentiality, legal, regulatory or other reasons. This results in varying data-driven and validation processes across a business. For an enterprise data management solution to be transparent and consistent across the whole business, a consolidation of data from data silos into one
Figure 1: A representation of the various problems data management solutions are designed to address.
Data quality, data used in operations, decision making and planning, is also a constant issue for most, if not all, businesses (4). Data quality can be negatively impacted in a variety of ways, including format variation, location change, discrepant values or time dependence. Formatting changes would involve a restructuring of the way the process collects data, and a change in publishing time would mean a change in how and when this data is collected (scheduling). Location changes will require that the collection process points to the new location. Data quality can also be adversely impacted due to factors such as daylight savings time, dynamic dates, and holidays or weekends. Inconsistent row counts, erroneous data points, corrections and revisions are also common place in data source publishing, requiring a rich and robust data validation process. Because of all these data quality issues, the understanding and tracking of data flow through a business can become an opaque, inconsistent, demanding, time-dependent and time-consuming process. For the data management problem to be solved, a solution must be able to automate the collection process, and be able to determine the completeness, correctness and timeliness of incoming data.
Data Management in the Insurance and Reinsurance Industry

For the insurance and reinsurance industry, there are three key qualities that data must have to become actionable from a risk analysis and mitigation perspective: data must be transparent, secure and valid. This section will discuss these three issues. Any business would like the data flow, analytical methodology and data-driven decisions to be transparent, but this is a crucial requirement for the insurance and reinsurance industry. The ability to trace data from the publishing source, through the techniques for data validation, cleansing, aggregation and enrichment, along with how this data is then used to enhance statistical models and influence other quantifiable metrics needs to take place for two primary reasons: auditability and data governance.

In terms of auditability from a data perspective, a data management solution for the insurance and reinsurance industry must have a log of all interactions with specific data sets. The ability to track where the data comes from, how it has been validated, analyzed and/or changed must be present, so that the risk-profiling techniques and statistical modelling approaches can be verified before being implemented. Given that audits are likely to take place on a regular basis, the ability to determine not only who has done what, but who has access to which data sets is essential. However, the tracking of who has access to which data set can significantly offset the cost of a data management solution by reducing the number of expensive entitlements needed to data subscription services.

Given the rise in risk management implementation throughout enterprise level structures, and the large positive impact this is playing in their ability to mitigate risks in terms of financial performance (5), a data management solution must include tools that clearly establish complete transparency in any data-centric organization. This transparency must start with data collection, through data validation, data analysis up to the execution of marketable insights. Only with transparency of data and work flows throughout the entire business will risk management be able to establish a methodology for enterprise data governance, auditability and compliance.

The second data quality issue to be discussed is that of security. The security around not only internal and proprietary data, but also external, subscription based data must be of the upmost importance. This is especially important for financial based industries such as insurance and reinsurance, where data is not only crucial and proprietary, but is also considered an asset. A business must know that their data is being accessed by the correct individuals only, and that any changes to data are logged appropriately for the audit process. Also, a data management solution vendor must have stringent data privacy and security policies. Thusly, a data
management solution for the insurance and reinsurance industry must include the option for the client to host the solution, so that data can be contained on-premises, behind the business's own firewalls. For a further discussion of the concerns and recommendations surrounding security issues involved in cloud computing, please see CEPIS (6).

Not only do the insurance and reinsurance industry typically have very large data needs, including multiple sources, formats and types of data required, but the data must be of the highest quality. Consequently, data must be delivered directly from the published source in a timely, complete and correct fashion. This must be the most up to date set of data, with the automatic collection and application of revisions and corrections, and it must be secured in a discrete manner to provide access to every authorized person that requires this data. Data management for a business should be modelled, thereby allowing the compliance and data contracts to support the selection and utilization of the solution (7).

Even with the above checks for data validity, the ability to create configurable, automated tests to check for data consistency and correctness is a requirement for many industries. Given that a business may have several hundred external data sources, many internal data sources, all of differing levels of granularity, detail, units and other attributes, the automation of validation processes for this data is a necessity for most IT departments. Only with industry specific validation testing of data will the full value of this data be realized, through its application in data-driven decision making.

The adoption of a data management solution is to maximize the efficiency, accuracy and effectiveness of current business processes, a disruption could have a large and costly effect on the business. Thusly policies, such as disaster recovery, data synchronization and the minimization of downtime, must be included and enforced through high quality Service Level Agreements (SLA's). This will minimize the risk associated with the localization or interruption of technology related services.

With the large data management requirements for the insurance and reinsurance industry, a business has two options: in-house development of an enterprise data management solution (EDM), or use a vendor supplied system. For a discussion of in-house development, potential costs and requirements, please refer to “Weighing the Options: Build an Internal EDM System or get ZEMA” (8). The other option is to consult a data management specialist, one that has industry recognition, a multitude of technology and data partners, has many years' experience in implementing and maintaining enterprise level data management solutions, and whose specialty is data; data collection, data processing, data validation, data aggregation and data integration.
ZEMA: The Data Management Solution

The best-of-breed Enterprise Data Management solution for any business, ZEMA, is an end-to-end solution that solves the large and intricate data requirements that the insurance and reinsurance industry have. This solution has been developed by ZE PowerGroup, and has had sustained recognition from launch in 1995 to the present. This comes not only from respected awards from Energy Risk and other industry recognized bodies, but from partners such as Platts and Allegro, and our client base. With over 20 years’ experience in the enterprise level end-to-end data management industry, and over 85 clients that range from subscription clients to large clients utilizing thousands of data feeds with a world-wide user base generating 10,000+ automated daily curves, ZEMA is synonymous with data management.

The following Figure 2 demonstrates ZEMA’s ability to collect any and all digital data, with any format, any granularity, at any time from any source, centralizing this data into a single database. This data can then be pushed (or pulled) into any downstream system, allowing the data processes within a business to be completely transparent, efficient, accurate and effective. The industry leading SLA’s ZEMA has put into place ensures that clients are served rapidly and effectively. Excellent data quality is ensured by over 200 employees dedicated to data collection, data validation and data quality, making sure that data of the highest standard flows through a business. This means that any variation on format, structure or timing of published data is dealt with quickly and efficiently on both a proactive and reactive basis. A data-feeding feature called DataSync is incorporated into ZEMA, automatically syncing data to clients from ZE’s data centers should a feed break, so that the most up to date data is always available. Revisions are automatically applied and logged, data is validated by checks of timeliness, completeness and correctness that can either specified by the client, or by default settings set up by ZE’s data specialists.
Figure 2: The ZEMA enterprise data management system creates a collected, consistent, high quality, centralized golden source of information that can feed any and all downstream systems.
Figure 3: The ZEMA end-to-end enterprise data management solution.

Figure 3, the ZEMA data management solution, has an application that deals with every data challenge a business faces, increasing automation and growing the analytical capacity of the insurance and reinsurance industry. For data, Data Manager schedules the collection of data, Data Validation safeguards the consistency and reliability of that data and Admin Console administers the access to the data. For analytics, Market Analyzer is an advanced query engine, allowing data to be easily used and examined, Data Direct is an Excel add-in, allowing data to be dynamically embedded into spreadsheets, and Dashboard allows the arrangement of market snapshots. For automation, Curve Manager is a workflow engine, allowing the automation of intraday and end of day processes along with the application of advanced data validation techniques, and Curve Portal allows data to be uploaded to the database. For Integration, Web Services and Adaptors allow data push/pull integration with downstream systems, including R, Tableau and Matlab, ETRMs and CTRMs.
The ZEMA Value Proposition and Competitive Differentiation

The ZEMA Suite is a complete data management enterprise solution that meets the ever expanding needs of the insurance and reinsurance industry. ZE’s goal is to ensure that clients’ receive maximum value from the ZEMA suite of products, through a maintainable, scalable and highly effective architecture that exceeds IT and business user expectations. The ZEMA suite of applications allows clients’ to minimize risk: contractual risk, market variation risk, IP security risk, compliance risk and operational risk. The value that ZEMA adds to any enterprise is great, and allows businesses in the insurance and reinsurance industry to focus on their core principals and processes, namely the analysis, pricing and mitigation of risk.

The key differentiators of our products include:

• Unmatched report and source data capture
• Powerful and user friendly web based GUI for reporting and analytical capabilities
• Simplified integration with any downstream systems
• Multiple deployment options (On-site, ZE Hosted and Subscription)
• Real time data capture of multi-granularity data
• Open architecture ODBC/JDBC Compliant database
• ZEMA is infrastructure and operating system agnostic
• Data Quality Assurance and Audit Trails
• Ability to map internal databases and client specific files into ZEMA
• Strong security model including LDAP/Active Directory compatibility
• Scalable and flexible solution that can develop as your business grows
• Well defined, fixed annual license escalation rate, minimizing associated contract risk
• 24x7x365 customer support and service widely recognized as industry-leading
• Automation of all data-driven processes within a business
• Optional Managed Services to off-load IT time and resource allocation
• Aggressive and rigorous SLAs, RTOs and RPOs for well documented client satisfaction
Conclusion

The insurance and reinsurance industry has become large consumers of data, which will help change and improve the efficiency and effectiveness of data-driven decision processes, sophisticated risk-profiling techniques, statistical-based modelling approaches and identification methodologies for emerging or growing risk assessment. These would include such aspects as increasing automation, predictive analytics, finer levels of granularity and signal processing, all of which need large quantities of high quality data to be fed into simulations and models. These all require the complete integration and utilization of internal and external data sources.

However, this data utilization for any industry comes with an associated cost of time, money, and infrastructure or internal resource allocation, making the incorporation of structured data into the business a difficult undertaking. Given the insurance and reinsurance industry’s need for large volumes of high quality, consistent, centralized, validated, auditable data collected directly from source publications, can businesses relying on legacy systems be able to incorporate the potential this data has into their processes and methodologies? And would such an undertaking by these businesses with legacy systems be feasible by developing an in-house data management system, in terms of time to market and long term cost of ownership? The answer is likely “no”.

ZEMA, the end-to-end data management solution, is a robust answer to this problem. It is not only the industry’s leading data management solution, but it solves the major issues that a data-centric business has, from improving accuracy of modelling approaches and pricing, timeliness and quality of collected data, to the ability to push this data to downstream systems, whether it be 3rd party or proprietary. With ZEMA, you can ensure that your data is of the upmost quality, the solution scales with any client, is transparent and easily auditable. If considering an enterprise data management solution to enhance your business processes, why use anything less than ZEMA?
References


