WHITE PAPER

RISK MANAGEMENT

THE ART OF ADAPTABLE ARCHITECTURE – IMPLEMENTING BCBS 239

SVEN LUDWIG AND MARKUS GUJER
FIS

RISK MANAGEMENT

THE ART OF ADAPTABLE ARCHITECTURE – IMPLEMENTING BCBS 239

The Data Quality Puzzle

Most banks are facing an uphill struggle to produce their group-wide risk reports in a timely manner. Data quality issues, reconciliation problems, missing alignment between multitudes of systems coupled with tedious manual processes are turning this seemingly straight-forward task into an increasingly difficult challenge.

To address these issues the Basel committee issued its new regulation on risk data aggregation and reporting (BCBS 239) that forces banks to invest heavily into their risk IT capabilities to reach the set goals on timeliness, completeness, accuracy and adaptability. As outlined in an earlier FIS whitepaper called "BCBS239 – The $8 Billion Game Changer for Financial Institutions", technology is not the silver bullet per-se but needs to enable better business processes. Stricter data governance coupled with holistic end-to-end data management and correction processes is at the heart of BCBS 239 but also more alignment between systems and functional teams is needed.

The guiding principle here should be the definition of a standardized taxonomy system throughout the entire company and across the entire data life cycle. This should both be company-specific and come with a corresponding data dictionary that covers all risk, finance and ideally regulatory reporting aspects. The challenge of developing this taxonomy is not only to standardize designation, but also to define the characterizing features of the individual data elements – and their required granularity and frequency.

The challenge of developing this taxonomy is not only to standardize designation, but also to define the characterizing features of the individual data elements – and their required granularity and frequency.

Data Inventory

The first step should be to create an inventory of all (risk, finance and regulatory) reports. Then, on the basis of the individual reports, one should work backwards to determine the data required. This data must in turn be transferred and defined as data objects in a non-context-dependent way, assigning each data object to a responsible person within the company's data architecture and governance system. This responsibility will apply throughout the group and independently of context.

Defining a data driven organisation

Some companies bring together responsible individuals in virtual teams, with others setting up a dedicated specialist section for data management under the leadership of a chief data officer (CDO), normally reporting directly to the board. Irrespective of organizational structure, collective responsibility for the data lies with the technical and IT sections.

Data quality: a micro and portfolio perspective

The above steps can only ensure the integrity of data, not an adequate level of quality. Data quality must be managed on a variety of levels. The micro level is all about assuring the quality of individual items of data, such as market values of individual portfolios. But at a higher level, such as that of the portfolio, the quality of aggregated data also relies on that of individual data. However, quality assessment on higher levels can reveal faults in both the structure and content of an organization's data management systems and is therefore a necessity as the process continues.

The first step to art - The ban of manual processes

BCBS 239 compliance provides insights into the design of processes. To deal with a wide range of ad hoc queries and fulfil all principles of the regulation – even in phases of stress and crisis – risk reporting must be a completely automated process with no media interruptions. This would lead to the elimination or restriction of Excel-based processes and manual interventions.

The data quality framework

As a result, the processes for calculating and producing data could be standardized on a daily and if required intra-day basis. As well as benefiting from high levels of automation, reporting could take place at varying frequencies, as required, and data quality would be assured on a daily basis. This would enhance the quality of monthly reports, while reducing the number of sources of error and points of analysis. Ultimately it could increase the speed at which reports are made available, and thereby make it possible to improve control and timeliness simultaneously. However, while it is still possible to adopt an agnostic approach to the data quality framework as a technology, a technological leap forward is still necessary to create a new layer of risk reporting and analysis. This leap forward in technology must take place within the foundation of the IT architecture. Reporting and corresponding decisions would follow the concepts of the foundations and build on top of it.

Very few institutions would opt for a fundamental "big bang" involving fresh implementation of their IT architecture, likewise are data warehouse projects risky and tend to be endless. If we take account of the fact that the IT architecture goes hand in hand with the data quality framework, i.e. as a data object model specific to the individual group, then for purely time and resource-based considerations, the timeframe imposed by the regulations is extremely tight. The aim here is to define a target architecture and reach a decision on a component-based IT infrastructure. This makes it possible to implement the IT architecture in a series of consecutive steps in a flexible sequence.

The general adaptability of Principle 6 of BCBS 239 implies the necessity for considerably greater flexibility than is currently the norm. Daily or even ongoing calculation and aggregation of risk data, carried more frequently intraday, results in considerably required enhanced performance. In terms of flexibility and performance, traditional relational databases in combination with large volumes of data will rapidly reach their limits. The requirement for large volumes of data in the big-data sector, such as for Monte Carlo-based market risks or credit exposure calculations, with flexible drill-down throughout all of their dimensions, is enormous. Characteristics, flexibility and speed in conjunction with large volumes of data are only compatible with modern in-memory technologies.

Here, pure technology is of little use: what is required, rather, is a combination of technology, understanding of finance, risk management, reporting processes and underlying analytics - financial mathematics calculation. As well as BCBS 239, one should also take into account the entire value chain within a bank, including the trading book in particular. Here, portfolio-based methods of risk management (in particular FVA, XVA, KVA, IM, as well as LR, LCR and RWA) come to the fore as soon as the transaction is initiated and valued (i.e. what is termed "risk at inception" and "global pricing"). These aspects of risk management jointly dictate the speed and availability of calculations within the group. The classic data warehouse (DWH) concept and the associated technology are therefore superseded in a number of ways.

This leap forward in technology must take place within the foundation of the IT architecture. Reporting and corresponding decisions would follow the concepts of the foundations and build on top of it.

The next generation BCBS 239 IT architecture

Nevertheless, there is no uniform blueprint in place for BCBS 239-compliant infrastructures. As the system landscape, every risk and finance report of each bank is designed individually, every BCBS 239 infrastructure that encompasses existing solutions will be specific to the individual institution. A BCBS 239 infrastructure will represent far more than a supplementary new software package – or business intelligence reporting project complementing the existing software solution. Instead, the art lies in ensuring that all people and systems within the banking group are working with the same data, the same models and the same assumptions.

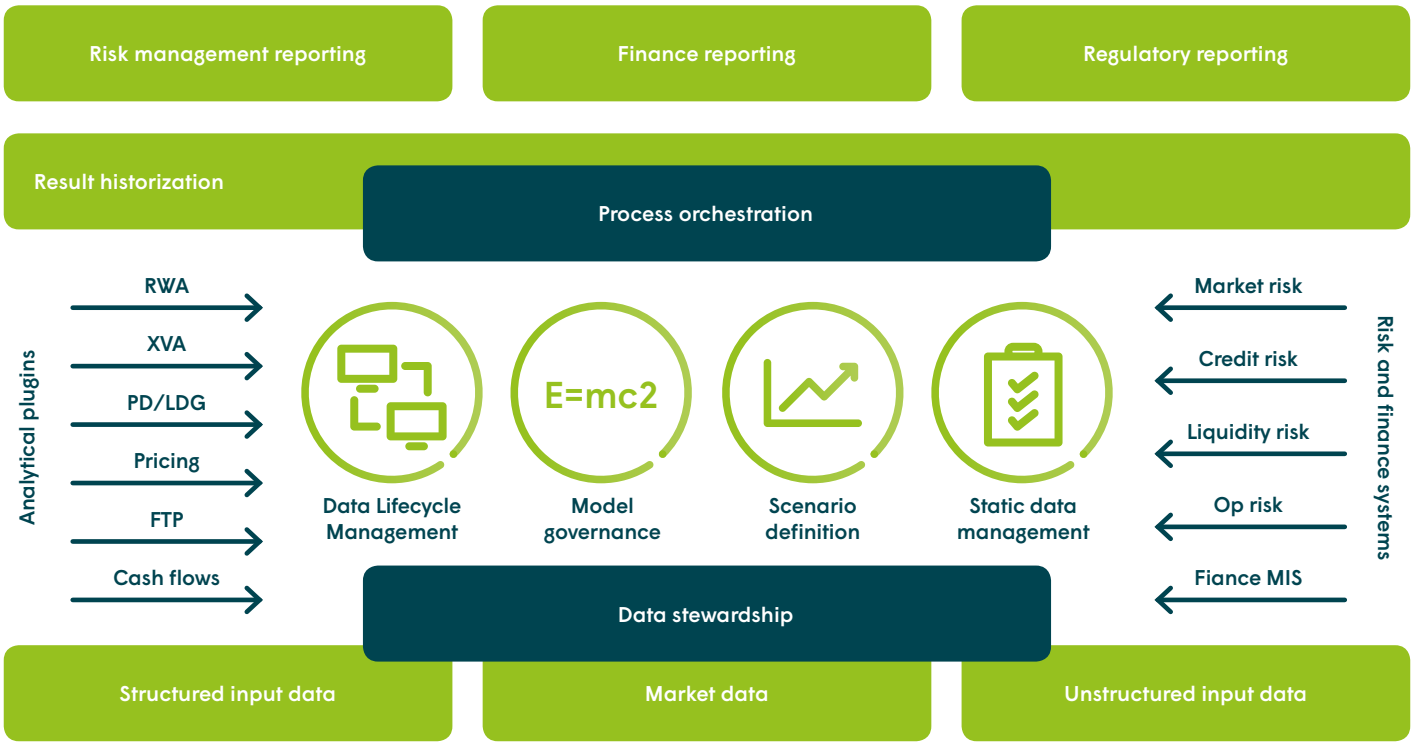
A system landscape inventory is also necessary, as there are bound to be a number of systems with overlapping functionalities, particularly in the case of larger institutions. To manage this challenge, a central application registry should stand at the heart of every BCBS 239 infrastructure. For each individual application the registry should contain the details of the portfolios being processed, the input data and calculations required and the results that can be generated in the required frequency and granularity. This will allow the systems to be used for appropriate analysis to be controlled centrally, so as to prevent instances of redundancy and potentially contradictory results. In line with the merging of different types of risk, instead of the traditional focus on individual risk categories, the emphasis will now be very much on an overall view of the risk.

If a BCBS 239 infrastructure is to be effectively implemented, it is necessary to ensure that the following particular processes are administered centrally:

- data lifecycle management – storing the required data in the relevant versions.
- model governance – managing the risk models used.
- scenario definition – central definition of future market scenarios.
- master data management – uniform definition of dimensions used, counterparties, etc.

If a standardized system for risk reporting is to be achieved for the entire bank, the management of master data is of particular relevance. Only if dimension features and attributes display the same significance and granularity throughout all systems is it possible to analyze the entire body of results produced. The management of master data also ensures that object identification (ID) is assigned unambiguously throughout all processes. Customers and transaction data are examples of objects for which IDs must be assigned throughout a group wide unique ID. This ID should be applied consistently throughout the entire value chain. If the individual systems are to be synchronized with one another, a system of process orchestration is also essential. This represents the second core element of a BCBS 239 infrastructure along with the application registry (see Figure 1).

Figure 1: Illustration of a BCBS 239 architecture



Adaptability as the DNA of a BCBS 239 infrastructure

What we understand by process orchestration is the structured interplay between various risk and financial applications. As indicated above, a bank's risk management system normally includes a large number of systems in productive use. In a modern process orchestration system, the set aim is to achieve automatic registration of plug-ins and applications in the registry. This makes it possible, for example, for the BCBS 239 infrastructure to create an entire process chain out of the systems and plug-ins necessary for calculating whole-bank stress test scenarios. Ideally, these processes would change automatically along with the systems and plug-ins themselves.

Correspondingly, new requirements could also be catered for – possibly by adding functionality to the plug-ins or extending systems within the adapting infrastructure. There are two kinds of applications to consider here:

- analytical engines capable of carrying out a specified calculation (e.g. cash flow generators, market value calculators or credit exposure analytics).
- full-scale rating risk applications covering an area of risk extensively or even entirely.

Based on considerations of n adoptable and flexible IT architecture (instead of system architecture) it would be desirable to build mainly on analytical engines that could be combined at will. Although this is mainly wishful thinking, skilful process orchestration could help control full-scale applications in the same way as analytical to generate partial results – suitable for further use by other systems. A further advantage of central process orchestration is the fact that when correcting faulty input data, the entire process chain can automatically carry out a correction run.

Future proofing with unstructured data

However, one key question remains: how can one react promptly to ad hoc queries requiring information that is not centrally administered? In such cases it is also advantageous to keep a pool of unstructured data over the period along with the structured data, i.e. that which is currently known and required. One example could be transaction data from savings and deposit accounts. Another might be additional information on customers or securities not currently used by risk systems, but available in front-office systems once transactions are concluded. It is frequently the case that front-office systems do not keep historical records of such details. So when they are actually required they are either no longer available or only in their current version – not that of the time the transaction was concluded. But if one is looking to store this kind of data on an ongoing basis, it will clearly mean working with enormous volumes of data. Big-data solutions introduce a cost-effective means of making such data volumes available, although they were not originally developed for this purpose.

However, one key question remains: how can one react promptly to ad hoc queries requiring information that is not centrally administered? In such cases it is also advantageous to keep a pool of unstructured data over the period along with the structured data, i.e. that which is currently known and required.

Summary

Risk management requirements are growing and becoming more complex, and the frequency at which new reports and analyses are called for is steadily rising. Accordingly, to create a BCBS 239 infrastructure, banks must pay special attention to the possibility of extending their data management architecture. The described plug-in mechanism for data and involved systems can help to rapidly meet additional requirements while maintaining the integrity of a bank's system as a whole.

SOURCES

Basel Committee on Banking Supervision (BCBS): (Principles for the Effective Aggregation of Risk Data and Risk Reporting (BCBS239), January 2013.

Basel Committee on Banking Supervision (BCBS): Progress in Adopting the Principles for Effective Risk Data Aggregation and Risk Reporting (BCBS 268), December 2013.

Basel Committee on Banking Supervision (BCBS): Progress in adopting the principles for effective risk data aggregation and risk reporting (BCBS 308), January 2015.

Ludwig, Sven: BCBS239 – The $8 Billion Game Changer for Financial Institutions, SunGard, 2014. Ludwig, Sven and Gujer, Markus: "Status Quo, Kosten und Lösungen – Die Umsetzung von BCBS 239", in BCBS 239 Regulatorische Anforderungen und effiziente Umsetzung, Editors Wilhelm Niehoff, Stefan Hirschmann, Bank-Verlag, Cologne 2014.

Senior Supervisors Group: Progress Report on Counterparty Data, 2014.

About FIS' Solutions for Risk Management

FIS' solutions for risk management cover pre- and post-trade risk management; integrated, enterprise-wide market, liquidity, credit and operational risk management; asset liability management; and trade surveillance. These solutions can be used across trading and clearing platforms and around multiple asset classes to help organizations better understand their exposure, improve the visibility and understanding of risk across the enterprise, and comply with regulations globally. FIS' customers include banks, broker-dealers, securities firms, clearinghouses, hedge funds, pension funds, asset managers, insurance companies, corporations and government entities of varying sizes, geographical locations and organizational complexities.

About FIS

FIS is a global leader in financial services technology, with a focus on retail and institutional banking, payments, asset and wealth management, risk and compliance, consulting and outsourcing solutions. Through the depth and breadth of our solutions portfolio, global capabilities and domain expertise, FIS serves more than 20,000 clients in over 130 countries. Headquartered in Jacksonville, Florida, FIS employs more than 55,000 people worldwide and holds leadership positions in payment processing, financial software and banking solutions. Providing software, services and outsourcing of the technology that empowers the financial world, FIS is a Fortune 500 company and is a member of Standard & Poor's 500® Index. For more information about FIS, visit **www.fisglobal.com**


www.fisglobal.com


twitter.com/fisglobal


getinfo@fisglobal.com


linkedin.com/company/fisglobal