

DATA WAREHOUSE AUTOMATION FOR BANKING AND FINANCIAL SERVICES

DRIVING SPEED AND AGILITY WITH KALIDO

October 2014

A White Paper by

Dr. Barry Devlin, 9sight Consulting
barry@9sight.com

Banking and financial institutions have been long-time innovators in business intelligence, using data warehousing to improve reporting, drive profitability and reduce risk. However, rapidly changing market conditions, increased regulation and the emergence of new competition are driving a need for faster, bigger and more agile solutions. Traditional data warehouse implementation approaches struggle to meet these needs. Data warehouse automation—using an integrated set of tools and techniques that automate the design, delivery and maintenance of data warehouses and marts—is now addressing these demands.

This paper examines four use-case-based business needs in banks and financial institutions that demand increasing speed, agility and business-IT collaboration in today's market conditions. In each of these areas—reporting, risk management, customer profitability and responsive decision making—we examine the business challenges, prior and current implementation problems, and the answers offered by data warehouse automation.

We conclude that this agile, integrated and structured approach, with enhanced collaboration between business and IT, drives faster and more flexible IT solutions and, ultimately, better and repeatable business results.

Sponsored by:
www.kalido.com



CONTENTS

- 3 Data warehouse automation—
a bird's eye view
- 4 Telling it like it is
- 5 Taking no chances
- 6 Customer as king
- 7 I want it all, and I want it now
- 8 Conclusions

The Banking and Financial Services market is facing a period of unprecedented change. Competition comes from all quarters; many not even traditional financial institutions, driving a plethora of new products and services. Customers expect their needs to be anticipated and want to bank when and where they please via mobile technology. Their loyalty or long-term value can no longer be taken for granted. Government oversight and regulation is increasing since the 2008 financial crisis.

One constant stands at the center of efforts to deal with all this change: information. To the man on the street, banking is about money. For financial institutions, wealth is information, and information wealth. Success, and even survival, in today's Banking and Financial Services business depends on your ability to extract real value from that information. That, in turn, depends on how well you manage the information asset. With ever growing data volumes, new sources and demands for ever faster decision making, management of that information is itself an increasing challenge.

Financial institutions have long been at the forefront of innovation in the use of information. A new commitment to information innovation is now called for: a wave of innovation that rapidly combines and uses all of the business' information in ways perhaps never previously conceived. It will affect every aspect of business in a different manner. But, underlying that will be a common approach to delivering, managing and using information. Of course, that was the old—and often broken—promise of data warehousing and business intelligence (BI). In the light of the current market evolution, it's a promise that must now be fulfilled. Fortunately, technology has also evolved to make it possible: data warehouse automation (DWA) offers the answer.

This paper describes four business challenges based on real use cases and how DWA addresses them. Two challenges span multiple business functions and two are more focused. High quality financial *reporting*, both for internal use and to regulatory authorities, is a mandatory foundation for every financial institution. Both consistency of results and the speed and frequency of their delivery through BI are increasing in priority as governments push for more transparency. This is often seen as an added but unavoidable cost. In contrast, *responsive decision making*, is fast becoming a key differentiator for financial institutions. With the march of mobile devices, new products and novel payment methods are emerging monthly. Business managers must decide where to focus marketing and support effort to retain existing high value customers and win new, valuable clients. An agile and responsive data warehouse environment is a necessity in this emerging world.

Among the functional areas, the importance of BI continues to grow in *risk management* where new products, channels and markets increase risk of all categories for financial institutions, much of it driven by the rapid increase in speed and volumes of transactions on the Internet. Consolidation of data in the warehouse, as well as near real-time access to transactions, offers to mitigate the risk. *Customer profitability*, especially since the Great Recession at the end of the last decade, has become a growing concern for financial institutions. Here, BI and data warehousing are at the heart of identification of high-value customers, their retention, and opportunities for cross selling and upselling.

Despite its long history and growing importance in the four areas above and more, traditional BI implementation is a challenge. Enterprise data warehousing projects are notorious for time and budget overruns. Localized data marts deliver value faster and more reliably, but often compromise data consistency and are difficult to maintain. Data warehouse automation, as we shall see, is proving to be increasingly successful in addressing these issues. More importantly, DWA is delivering rapid and sustainable business value.

DATA WAREHOUSE AUTOMATION—A BIRD'S EYE VIEW

Data warehouse automation is simply the use of an integrated set of tools and techniques that automate and simplify the design, delivery and ongoing maintenance of data warehouses and marts. It stands in stark contrast to the traditional, bespoke approach that demanded a wide range of IT skills and tools, everything from requirements gathering and data modeling to application programming and database optimization, leading to cost and time project overruns, requirements creep, and challenges in maintenance and upgrade.

The growing business need for speed and flexibility in application delivery has driven agile development methodologies, with incremental delivery of function and direct, ongoing business involvement in design. Meanwhile, with operations now mostly automated, the focus for IT is on commoditization, maintenance and cost reduction, often with consequent down-skilling and/or outsourcing. In this new world, data warehouse automation tackles the old challenges of design, development and maintenance through a fully integrated, simplified environment, incorporating agile design principles:

Data warehouse automation is the use of an integrated set of tools and techniques that automate the design, delivery and maintenance of data warehouses and marts.

- Business ownership and involvement throughout all phases of the project closes the gap between initial requirements and first results, and minimizes the risk of late changes and disappointments
- A business information model provides a common language for communication and collaboration between business and IT
- An iterative development approach enables thinking big, starting small and evolving
- The development process involves small projects with cross-functional delivery teams composed of business and IT members
- Change is the one certainty and the pace of change is increasing; the methodology and design principles support a reality where every component will change many times over a multiyear lifetime of the warehouse
- Business meaning drives the data model, business rules and documentation needs, all stored and managed together as an integrated resource for initial deployment and ongoing maintenance
- Delivering early business value drives data warehouse success; DWA enables such business value delivery on an ongoing basis while the technical platform evolves in parallel
- Cross-functional, end-to-end governance provides oversight across business teams and technical silos, enabling prioritization of activities that deliver the most business value and common data warehouse foundation in the shortest timeframe

Although named data *warehouse* automation, the approach is widely used in both data warehouse and data mart deployments. The term data warehouse is used here to denote an enterprise-oriented deployment where cross-functional consistency is an important driver; a data mart focuses exclusively on the reporting or analysis needs of a department or similar business group. These approaches are not mutually exclusive. They may be—and often are—combined in an overarching strategy to deliver decision making support to the business. In such cases, DWA can be particularly useful in spanning from enterprise to departmental scope and *vice versa*.

TELLING IT LIKE IT IS

Management reporting has always been at the core of data warehousing. And whether it's the generation of a regular report or the ability to quickly answer a manager's seemingly simple question about a particular customer's overall standing, management reporting has always been at the heart of banking. It is, after all, about trust. Nonetheless, the IT systems at many banks and financial institutions are so complex, diverse and disintegrated that answering simple questions is seldom simple at all. In an Economist report ¹in the wake of the 2008 financial crisis, Peyman Mestchian, of advisory firm Chartis Research, declared: "Answering such questions as 'What is my exposure to this counterparty?' should take minutes. But it often took hours, if not days."

THE BUSINESS CHALLENGE

Reliable, consistent and timely internal management reporting is a prerequisite for good regulatory reporting because management are held responsible for and must feel confident in what is being reported externally. The financial crisis of 2008 has seen increased demands for transparency in financial institutions in terms of capital reserves, risk coverage, leverage, liquidity and so on in terms of Basel III, Dodd-Frank and other frameworks. Furthermore, because most financial institutions today are the result of multiple mergers, each division often has different views of common subjects like accounts, customers, custodians, brokers, etc. While there may be some leeway internally with regard to consistency of reports across the organization, once reports are made externally, any further change or error discovered is at best embarrassing and at worst commercially or legally disastrous. In this external reporting context, the "single version of the truth" is mandatory.

THE DELIVERY PROBLEM

Unfortunately, traditional reporting solutions fail because of a lack of common understanding and shared vocabulary for information needs, and a diverse set of data sources that were never designed to work together. Beyond initial design and development, ongoing maintenance and update of definitions, reports, etc. is a challenge. Regulations are subject to regular and unanticipated modification in the face of market changes. Mergers and acquisitions, and other business changes drive ongoing evolution and unanticipated revolution in the underlying data sources.

The traditional design approach built walls between business and IT, dividing the process into separate parts and iterating sequentially between them. First, business modelers define the requirements, vocabulary and data structure needed. Second, IT experts scour existing data sources for relevant data. With only incomplete and/or inconsistent data sources available, the process loops back to the business modelers—perhaps weeks or months later—to seek compromise. And often returns to IT again for a second or third attempt. The process is slow, tedious and error-prone. Furthermore, the design documentation often lacks continuity; even small future changes require significant investigation and rework. Business users grow frustrated and IT becomes morose.

THE MODERN ANSWER

Data warehouse automation addresses this fundamental issue by bringing business and IT together in business modeling and data sourcing as a single phase, based on an agile methodology. Rather than handing over a supposedly complete set of requirements (long recognized as impossible in warehousing), business users and IT work together on the individual elements of the data needed, concept by concept in the business view, and field by field in the sourcing view. As business and IT collaborate on each area, business people can define their expectations in a common lan-

Kalido eliminates the errors of time-consuming, manual effort, bringing detail, speed and transparency to our Business Intelligence team.

Executive Director, Latin American subsidiary of international bank

guage and clarify their needs in the context of what is actually possible. Meanwhile, IT can gain a real knowledge of the business and be clearly constructive in exploring possible solutions. As each relatively short iteration produces a small part of the final solution, the business users see continuous progress and IT knows that each deliverable is relevant and largely correct.

DWA also addresses the challenge of redesign and rework by creating and maintaining a single copy of the modeling and design work in a “metadata repository”. This is not only the agreed definition and specification of the warehouse, but is also the operational basis of every table structure, feed and transformation that comprise the working warehouse. Any required maintenance or update thus starts from a known and agreed base.

TAKING NO CHANCES

Banking/Financial Services and risk go hand in hand. Taking on risk, in its many forms, and managing it are core processes of any bank or financial institution. And data warehousing is at the core of risk management, both in the decisions regarding which risks to take on and in the actions necessary to mitigate those risks. In a rapidly changing world, driven by the enormous possibilities offered by new technology, the type and extent of risk that financial institutions must manage has grown accordingly. Furthermore, the speed at which exposure can change has also increased dramatically, and the window for appropriate action has radically shrunk. New and improved tools and methods are key not only to success, but also to survival, and data warehouse automation offers both.

THE BUSINESS CHALLENGE

Risk comes in many flavors—market, liquidity, operational and credit, to name but a few. For simplicity, we look at them in two broad classes: those incurred willingly to drive revenue and those that are unavoidable and due to natural weaknesses and people, systems or processes. The former category includes market, liquidity and credit risk, for example; the latter is mainly operational in nature.

Operational risk—particularly fraud, both internal and external, improper practices, and execution errors—is accepted as unavoidable and efforts are directed towards its early detection and immediate action. Speed is of the essence. Business analytics and data mining of real-time data flows is mandatory, as booking and reconciliation of digitized transactions becomes real-time. Extensive analytic models, based on the collection and integration of significant amounts of historical, current and in-flight data, must be built and applied on an ongoing basis. The bottom line, of course, is to find a balance between the costs of reducing a particular risk and keeping losses within some level of risk tolerance.

This aim also applies to the case of willingly incurred risk, such as market, credit and liquidity. Detecting changes in the external world and reacting in a timely and appropriate manner is mandatory. However, an additional level of support for decision making is desirable. Before taking on any of these risks, financial institutions need a way to model potential profits against possible risk. Such analysis also requires access to market, public and even competitive data from a wide variety of sources. The challenge here is less about speed (although that need is growing) than about the ability to understand the context and meaning of external data and to craft reliable relationships with internal figures. In the case of credit risk, for example, extensive new sources of demographic data from social media and elsewhere are now available and must be integrated with internal data.

In addition, regulatory authorities have increased their demands for oversight of all types of risk in the wake of the 2008 financial crisis. The reporting considerations discussed above also apply here.

THE DELIVERY PROBLEM

Data warehousing techniques are central to mixing and matching external data with existing risk measurement systems, all done at high speed. Building and managing analytic models, as well as applying them to the ongoing business, in particular, demand extensive agility. Unfortunately, traditional methods of design and delivery often lack the speed and agility required.

THE MODERN ANSWER

Data warehouse automation offers the increased agility to respond to rapid change that is particularly important for operational risk systems. Dealing with fraud is a wholly reactive business. As the fraudsters' methods change, the risk system must respond immediately; new patterns are discovered and must be added to the analytic models at the earliest moment to detect fraud and to avoid false positives. DWA's fully current and active metadata store of data meanings and transformations enables rapid and accurate update of the data and processes of the warehouse and risk-related data marts.

Other risk management processes also benefit from such ease of upgrade and maintenance, of course. But of more interest is the improved ability to prototype solutions collaboratively between business and IT. With the breadth and complexity of data sourcing required for these systems, DWA offers a faster approach to understanding what data is available where. It supports the frequent negotiation between the two parties needed to resolve issues of missing or limited data sources.

...discovered gaps in the reconciliation process including misallocation of certain transactions to GL accounts and identified and blocked fraudulent transactions being processed against credit cards.

Major multinational bank

CUSTOMER AS KING

Once upon a time, the bank manager was king of all he surveyed. His relationship with every customer was personal, individual customer profitability his responsibility alone. Today, each customer is proclaimed a king in her own right. Understanding and influencing her profitability is a growing challenge in the face of changing demographics and the impact of mobile technology.

THE BUSINESS CHALLENGE

With millions of customers, hundreds of products and multiple, largely impersonal, access channels, banks and other financial institutions face a growing challenge. Determining customer profitability depends on segmenting customers across internally and externally sourced demographic groupings, combined with detailed product use and ongoing social behavior. Past and current profitability, supported by activity based costing and more, must be supplemented with life time value predictions. Acting on these insights requires influencing customer behavior during perhaps fleeting contacts through mobile devices. The goal, of course, is identify and leverage opportunities for product cross-sell and upsell through campaign management. All of this depends on vast volumes of accurate, consistent data—historical, operational and predictive—covering all aspects of customer characteristics and activities.

THE DELIVERY PROBLEM

Creating a single view of customer-related information is not easy when the necessary data is spread across many systems that were never designed to work together. A particular challenge arises when IT systems predate acquisitions or mergers and cover both disparate and overlapping segments of the

customer or product set. Increasing data source complexity and rates of business change add to the challenge. Traditional data warehouse development, based on hand-crafted methods and disconnected tools cannot easily meet these complex design, development and maintenance needs at the speed demanded by today's business.

THE MODERN ANSWER

In such a complex and rapidly changing environment, a single, consistent and easily maintained record of the business model, data sources and transformations of the warehouse is vital. As a key component of data warehouse automation, such a metadata store offers important benefits. First, it provides a single place where all business definition and technical design for the initial customer profitability system is created and stored, contributing to the speed of delivery and accuracy of business results in this first project. Second, as new requirements emerge, the DWA metadata provides a map of what exists and how it can support or be extended for these new needs. Third, in the event of a merger, acquisition or even the implementation of a new system, the metadata store provides a stable baseline from which all new integration and development can reliably start.

...tripled loan volumes with a new mortgage data warehouse, implemented with Kalido in 90 days, that enabled us to proactively manage resources to meet changes in demand, as well as quickly adapting to new reporting requirements from regulators.

Large US retail bank

Investing in data warehouse automation in support of customer profitability and campaign management also has some very beneficial side effects. As a core data element for the business, customer is at the heart of many different business initiatives; getting it right for profitability means it can be safely used in other business projects. Reporting, both internal and regulatory, also benefits from improved core data.

I WANT IT ALL, AND I WANT IT NOW

In 2009-10, Spread Networks invested \$300 million in cutting and drilling its way from Chicago to New York to lay the shortest possible fiber optic cable and shave three milliseconds off the then 15 millisecond journey for stock trades between the two cities. By late 2012, McKay Brothers and Tradeworx were competing by microwave to reduce the time to 8.5 milliseconds. Similar and more extreme races are going on across the Atlantic and under the Arctic². High-frequency trading is perhaps the most extreme example, but it is not the only case of addiction to speed in Financial Services.

THE BUSINESS CHALLENGE

Reducing transaction time, whether for stock trades or simple payments, may be technically challenging, especially if trying to exceed the speed of light. However, most of the latency occurs not in the individual transactions but in the more complex processes of mixing and matching data from the many streams and sources that comprise a banking system. Two examples at opposite ends of the spectrum show the need for speed and the difficulty in achieving it when combining diverse data is involved.

Loan approval requires bringing together multiple pieces of data about a customer and their account balances and histories from a variety of systems. If approval is offered online, the calculation must be completed within the online attention span of the customer—typically less than a few seconds. Some data may be aggregated in advance, but a final real-time check will be required. At the other end of the scale, monthly closing of books has moved from an acceptance that it might take half the month to achieve to today's demand that it be done in days or less. And while we emphasize the speed in both

cases, it is also clear that agility is just as important. The data sources and rules for calculation are far from fixed and change requests come with demands for instant turnaround.

THE DELIVERY PROBLEM

Traditional data warehousing practice creates a division between business and IT. The former detail requirements and await the resulting design and implementation from IT. With such a disconnect, requirements can be easily misunderstood or overlooked. Reviews and iterations between business and IT stretch project timescales.

Speed of delivery and agility to changing needs are particularly difficult to achieve in this approach. As business needs change rapidly and warehouse performance becomes key, IT lacks the tools and techniques needed to manage both needs simultaneously.

THE MODERN ANSWER

Automation is at the heart of addressing business needs for speed and agility. And in the mixing and matching of data from different sources, data warehouse automation drives agility as has previously been discussed, but how can DWA help with speed of data delivery?

Speedy delivery and integration of data is achieved by adjusting data models and tweaking data population tools and processes. These are deeply technical tasks that depend on the skills of IT experts. Done well, the results may look like magic. But the secret behind it is in the attention paid to the details of the changes involved. The central metadata store built and used by DWA provides the reliable and consistent information about where data comes from, for sources are interrelated, what transformations have been made, what dependencies of meaning and timing exist between sources, and more. Successful tweaking of a data warehouse or mart to increase speed is dependent on the consistency and reliability of the engineer's knowledge of how the existing system was built. DWA is the only approach that creates and maintains one single store of all the information such an engineer needs.

Kalido enables us to vastly increase the velocity with which key information is delivered to the business.

VP, Global Investment Firm

CONCLUSIONS

Banking and financial services, like every other business sector, is facing a confluence of changes in the world, in business and in technology beyond any previously seen. A recent McKinsey report³ highlights a combination of emerging markets, demographic shifts and technology advances that *“will produce change so significant that much of the management intuition that has served us in the past will become irrelevant... The world ahead will be less benign, with more discontinuity and volatility and with long-term charts no longer looking like smooth upward curves, long-held assumptions giving way, and seemingly powerful business models becoming upended.”*

In *“Business unIntelligence”*, I described a new paradigm—the biz-tech ecosystem⁴—a new reality that most, if not all, new business advances and competitive advantage today spring from information technology. To succeed, business must take full advantage of IT knowledge and skills. And IT must step up to becoming knowledgeable and fully involved in the business too. This symbiosis of business and IT is still emerging, but its clearest need has long been in the area of business intelligence. Financial institutions, with their long history of investment in BI and their enterprise-oriented approach to data warehousing stand on the leading edge of this development.

Data warehouse automation is a key component of this shift. From its business-driven viewpoint, it directs attention to the external reality of the market and how to succeed there. With its focus on agility, it offers methods and tools to navigate today's rapidly changing markets. By its collaborative inclusion of business and IT in design and development, it accelerates the delivery of business-prioritized function and assures the accuracy of the function and data delivered. And through its use of a common, centralized store of the data warehouse meanings, models, sources, transformation rules, and more, it supports reliable and speedy iterative delivery and upgrade of BI function in line with the rapidly changing Banking and Financial Services landscape.

Data warehouse automation accelerates the delivery of business-prioritized function and assures the accuracy of the function and data delivered.

Dr. Barry Devlin is among the foremost authorities on business insight and one of the founders of data warehousing, having published the first architectural paper on the topic in 1988. With over 30 years of IT experience, including 20 years with IBM as a Distinguished Engineer, he is a widely respected analyst, consultant, lecturer and author of the seminal book, "Data Warehouse—from Architecture to Implementation" and numerous White Papers. His new book, "Business unIntelligence—Insight and Innovation Beyond Analytics and Big Data" (<http://bit.ly/BunI-Technics>) was published in October 2013.



Barry is founder and principal of 9sight Consulting. He specializes in the human, organizational and IT implications of deep business insight solutions that combine operational, informational and collaborative environments. A regular tweeter, @BarryDevlin, and contributor to [ITKnowledgeExchange](#) and [TDWI](#), Barry is based in Cape Town, South Africa and operates worldwide.

Brand and product names mentioned in this paper are trademarks or registered trademarks of Kalido and other companies.

¹ The Economist, "Silo but deadly", 3rd December 2009, <http://www.economist.com/node/15016132>

² Adler, Jerry, "Raging Bulls: How Wall Street Got Addicted to Light-Speed Trading", Wired, August, 2012, http://www.wired.com/business/2012/08/ff_wallstreet_trading

³ Dobbs, Richard, et al, "Management intuition for the next 50 years", McKinsey Quarterly, September 2014, http://www.mckinsey.com/Insights/Strategy/Management_intuition_for_the_next_50_years

⁴ Devlin, Barry, "Business unIntelligence—Insight and Innovation Beyond Analytics and Big Data", (2013), Technics Publications LLC, NJ, http://bit.ly/BunI_Book