Data Warehouse... Done

Automatic for and by the business

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Building and maintaining data warehouses have long challenged organizations, both large and small. These difficulties have often delayed or destroyed much needed implementations, especially in small and medium enterprises. Data warehouse automation—systems and methods—promise to ease these challenges. However, business buy-in and commitment is mandatory.

This paper describes three principles and practices by which business can support data warehouse automation projects. They are: diversity over disparity, collaboration over control, and agility over anarchy. Together, these approaches offer enable the creation of a "biz-tech ecosystem" where business and IT become true partners in the provision of data for business management.

Examples from four companies across very different industries show how these principles have been applied to deliver real results in initial implementation and ongoing evolution. In short, they allow IT and business to collaborate in a biz-tech ecosystem so that IT can deliver and maintain business intelligence solutions with the speed, agility and elegance required by modern business users.

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T he Edge, Amsterdam. It catches the first heat of the sun in the morning and captures the attention of techies all day. The 28,000 sensors at this new, green shared headquarters building[1] grab every last bit and byte of data to automate everything from getting your preferred coffee to saving the environment. It encapsulates the current drive for big data, Internet of Things, data-driven, real-time big business. And yet, for many small and medium enterprises (SMEs), getting standard month-end reporting quickly and correctly remains a challenge. Despite state-of-the-art, data-driven buildings, management and auditing teams everywhere still face an unimpressive array of incoherent data whenever they ask the seemingly simplest questions. Weren't data warehousing and business intelligence (BI) supposed to have supplied those financial and other management basics already? So that we can get going with all this new, sexy big data stuff?

For some thirty years[2], data warehousing has offered an architecture and technologies to consolidate disparate data, support reporting, and enable analytics—to improve the decision-making of business managers through consistent, correct information. The ongoing challenge has been how to build data warehouses quickly and efficiently in the first instance and maintain them agilely and cost-effectively throughout their lifetime. SMEs, with limited IT resources, have found it particularly difficult to escape the spreadsheet swamp to the high ground of coherent decision making. And even when they get there, they still face ongoing challenges of flexibility and auditability as the business and market rapidly change. The emerging approach of data warehouse automation (DWA) offers new hope to those drowning in small, stagnant ponds of everyday business data.

> *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.*

Despite its techie-sounding name, DWA should not be left to the IT department alone. Of course, the business will benefit from an IT-only approach. But the value will be so much greater and arrive so much earlier if the business is involved early and continuously throughout the process—from initial discussions to regular maintenance. To paraphrase John F. Kennedy[3]: "Ask not what your IT can do for you, ask what you can do for your IT…"

Three business principles and practices of data warehouse automation

T here exist many technological aspects of data warehouse automation that beg our attention. Our focus here, however, is on the business side of the equation. What can business do to enable and, indeed, drive the process of building and sustaining a viable business information asset? How can business support IT in improving the solution, speeding its delivery, and supporting its growth and change? The answers to these questions lie in three business principles and associated practices:

1. *Diversity over disparity:* the data needed to manage today's business comes from many sources, in many forms, and on many timeframes. Its native disparity is too great and too complex to be tamed one spreadsheet at a time. Its valuable diversity can be maintained only through the creation of a fully auditable common core set of structures and measures (also called a Data Vault[4]).

   The business practice accepts and describes this diversity of data needs, makes IT responsible for this common core and commits to use it as the principal data source for analysis and reporting.

2. *Collaboration over control:* with all business innovation being driven today by technology and data, business opportunities emerge from close and continuous cooperation between business and IT. It's no longer viable to think of business controlling IT or IT serving business.

   The business practice is to create a "biz-tech ecosystem"[5], a collaborative approach between business and IT to support diverse data in a consistent and controlled manner via the Data Vault.

3. *Agility over anarchy:* business and markets remain in a state of constant, ongoing change. Managing in this environment requires highly agile cooperation between business and IT to grow and repurpose common core data for new needs rather than deal with the anarchy of multiple and parallel data mart or spreadsheet-based activities.

   The business practice is to establish a process, often called a BI Center of Competence (BICC), comprising both business and IT skills to enable and drive the agile evolution of the Data Vault and data marts and tools fed from it.

The foundation for all such work is the software and methodologies that contribute to data warehouse automation. DWA software, such as Quipu, for example, accelerates and simplifies the technical process of building and maintaining the common core structures and measures in the Data Vault. The purpose of the methodologies is to ensure collaboration between business and IT. Together, they enable and support the three principles listed above.

Real life examples of the principles and practices in action

Global business goals with local operating autonomy

Consider a shipbuilding and maintenance business that has grown for almost half a century by acquisition of companies around the world in Europe, Middle East, Africa and Southeast Asia, more than 30 shipyards and related companies, in fact. Each company operates independently, taking account of local market needs for a range of different products, specific legislation and so on. Furthermore, each company has its own ways managing its business, its own IT systems, and locally-supported BI tools. The business wants it to stay that way; local responsibility enables local focus on quality and customer service. And yet, the headquarters absolutely needs to be able to get a timely and consistent overview of this ever-changing business.

This, clearly, is a question of data integration. Data from each subsidiary must arrive in headquarters with diversity rather than disparity. An order in Africa has different characteristics and data than one in the Netherlands. Singapore demands different regulatory reporting than the United Arab Emirates. Disparity would leave headquarters struggling to create any corporate reporting. Diversity means that data from each subsidiary must be understood in the context in which it was created, and mapped to common structures and meanings that make sense for headquarters' needs. Revenue and profit at a group level is vital, but also the ability to drill down into the next level of detail to understand local anomalies or exceptions from the overall trend. Data Vault provides the structure and the consistency required to deliver such diversity.

With this diversity of data comes the question of how to handle the change that is ongoing in this market. Conversions, cleansing, and consolidations all change in such circumstances. Hand-coded maintenance is, at best, too costly, at worst, impossible. DWA with Quipu, together with the flexibility of the Data Vault allows these transformations to be created and maintained with ease and elegance.

Competing on information

From its earliest days, insurance has been a business steeped in information. The business runs on information and, unlike many other industries, business people throughout the organization understand and use the core information of the business on a daily basis. As markets change and business evolves, so too do the information needs.

For a 150 year old Dutch insurance company with six distinct brands, information is central to the business and an IT-delivered data warehouse has long been a foundation for its management and external reporting. However, by 2012, increasing business demands for flexibility and auditability were beginning to strain the existing infrastructure. A new approach to delivery was needed, based on closer cooperation between the business and IT.

Data warehouse automation using a Data Vault approach provided the foundation for such collaboration. Business users, who understand their data needs intimately, worked closely with IT to rapidly prototype and iterate specific information solutions. Without the need for coding and recoding, IT delivers quickly. Business can see the progress and immediately influence its direction. Supported by an agile data model, users and IT speak the same language and progress in a consistent direction. And it requires much more than getting the initial implementation right. Ongoing change and maintenance are even more important. The Data Vault has become the shared memory of the business and IT in what they deliver and how it can grow. Collaboration is key to controlling the rapid pace of change needed.

> *Ted Groefsema, IT Manager Datawarehousing, VIVAT insurances:*
>
> *"In extracting, transforming and loading our insurance data to the source-datawarehouse, Quipu proves to be an essential part in keeping development costs low, changes manageable and time-to-delivery short"*

A central bank competing on service

Even normally staid central banks are finding that control is only one part of the equation. An expanding and diversifying financial marketplace requires ongoing flexibility and collaboration in reporting and regulation. In larger countries, the number of firms subject to regulation and reporting can run to hundreds and even thousands, each supplying information of varying levels of consistency and quality. Bringing such diverse data together into a common structure presents a considerable challenge using traditional methods.

Using a Data Vault as the central architecture, supported with DWA tooling, has provided an attractive solution to one such central bank. It has reduced initial development cost and timeframe, by eliminating coding and allowing the businesses to work collaboratively on the design of the reporting needed. Furthermore, the Data Vault model offers the flexibility to change the design of the database in a non-disruptive, controlled and auditable manner as business and regulatory needs evolve—a mandatory requirement for a central bank.

Even small businesses can have a real data warehouse

Data warehouses have typically been the province of larger enterprises. The cost and complexity of a traditional data warehouse have been beyond the means of smaller companies. Furthermore, most small companies operate a relatively simple and largely centralized business model, a situation in which a data warehouse offers fewer benefits. But, what if you are a small company with a distributed business model? In the insurance business, where information is at the core?

One company offers life insurance and funeral services. Its business model is as a cooperative, but it still needs to achieve reporting consistency and economies of scale to compete with larger commercial enterprises. DWA and the Data Vault approach simplify the implementation to the extent that this small company has been able to build their first data warehouse and maintain it with relative ease.

Although phrases like *data warehouse automation* and *Data Vault* usually invoke discussions about technology and IT responsibilities, the underlying issues are deeply related to business considerations. How diverse is the business in terms of location, function, legal structure, market and so on? What level and speed of market change are seen or anticipated? How important is ongoing innovation around technology and to what extent do business and IT work hand-in-hand? Under these circumstances the discussion must first focus on business realities and anticipate emerging needs.

While DWA and Data Vault are clearly technical tools to be bought and implemented by IT, their full benefit can only be realized when business and IT address the business needs together. With markets and business needs changing continuously and unpredictably, such tools are a necessity in today's environment. When the principles and practices of diversity of information, collaboration between business and IT and agility in development and maintenance are understood and agreed, the value of these tools becomes self-evident to the business. In such conditions, IT and business can collaborate in a biz-tech ecosystem and IT can deliver and maintain business intelligence solutions with the speed, agility and elegance required by modern business users.

> *Data warehouse automation and a Data Vault together are central to delivering and maintaining a high quality decision making support environment with the extreme agility needed to instantly react to rapidly and constantly changing business requirements and market demands.*

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.

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[1] Randall, T., *"The Smartest Building in the World"*, Sept. 2015, http://bloom.bg/1YHXPP9

[2] Devlin, B. A. and Murphy, P. T., *"An architecture for a business and information system"*, IBM Systems Journal, Volume 27, Number 1, Page 60 (1988), http://bit.ly/EBIS88

[3] John F. Kennedy's inaugural address, 20th January 1961, http://www.powerfulwords.info/speeches/John_F_Kennedy/5.htm

[4] A Data Vault is a detail oriented, historical tracking and uniquely linked set of normalized tables that support one or more functional areas of business. It is a hybrid approach encompassing the best of breed between 3rd normal form (3NF) and star schema. The design is flexible, scalable, consistent and adaptable to enterprise needs. See: http://danlinstedt.com/solutions-2/data-vault-basics/

[5] Devlin, Barry, *"Business unIntelligence"*, (2013), Technics Publications LLC, NJ, http://bit.ly/BunI_Book